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Access DB# 104494**SEARCH REQUEST FORM**

Scientific and Technical Information Center

Requester's Full Name: K. M. Vijayakumar Examiner #: 79358 Date: 9/24/03
Art Unit: 1757 Phone Number: 305-4931 Serial Number: 09937149
Mail Box and Bldg/Room Location: EP5-9453 Results Format Preferred (circle): PAPER DISK E-MAIL

If more than one search is submitted, please prioritize searches in order of need.

Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc, if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

Title of Invention: See Attached Sheets

Inventors (please provide full names): _____

Earliest Priority Filing Date: 4/30/1999

**For Sequence Searches Only* Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.*

STAFF USE ONLY

	Type of Search	Vendors and cost where applicable
Searcher: <u>EL</u>	NA Sequence (#) _____	STN <u>\$ 236.04</u>
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Clerical Prep Time: _____	Patent Family _____	WWW/Internet _____
Online Time: <u>85</u>	Other _____	Other (specify) _____

WHAT IS CLAIM

1. (cancelled)
2. (amended) A compound prepared by introducing an ^{intercalate} element belonging to an alkali metal group or a transition metal group into a vacant lattice point of In_2O_3 crystal having Sc_2O_3 type translational symmetric crystalline structure.
3. (amended) A compound prepared by introducing H into a vacant point of ZnO having hexagonal wurtzite type crystalline structure.



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BIBDATASHEET

CONFIRMATION NO. 6361

Bib Data Sheet

SERIAL NUMBER 09/937,149	FILING DATE 09/21/2001 RULE	CLASS 252	GROUP ART UNIT 1751	ATTORNEY DOCKET NO. TAN-295
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APPLICANTS

Shigemi Kohiki, Kitakyusyu, JAPAN;

Ryuta Kiyoshima, Isahaya, JAPAN;

Shigenori Matsushima, Kitakyusyu, JAPAN; Masakuni Sasaki, Kitakyusyu, JAPAN;

** CONTINUING DATA *****

This application is a 371 of PCT/JP00/01866 03/27/2000

** FOREIGN APPLICATIONS *****

JAPAN 11/123829 04/30/1999

Seaul
Reaused

k.m. vijayakumar
Art unit # 1751
ph: 703-305-4931
loc: CP3-913

Foreign Priority claimed <input type="checkbox"/> yes <input type="checkbox"/> no	STATE OR	SHEETS	TOTAL	INDEPENDENT
35 USC 119 (a-d) conditions met <input type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> Met after Allowance	COUNTRY	DRAWING	CLAIMS	CLAIMS
Verified and Acknowledged Examiner's Signature _____ Initials _____	JAPAN	19	2	2

ADDRESS

Sherman & Shalloway
413 N Washington Street
Alexandria, VA
22314

TITLE

Compound having dopant introduced into vacant lattice point while controlling position and concentration

FILING FEE RECEIVED 860	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:	<input type="checkbox"/> All Fees <input type="checkbox"/> 1.16 Fees (Filing) <input type="checkbox"/> 1.17 Fees (Processing Ext. of time) <input type="checkbox"/> 1.18 Fees (Issue) <input type="checkbox"/> Other _____ <input type="checkbox"/> Credit
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FILE 'REGISTRY' ENTERED AT 09:27:56 ON 25 SEP 2003

E LITHIUM/CN
L1 1 SEA LITHIUM/CN
E SODIUM/CN
L2 1 SEA SODIUM/CN
E POTASSIUM/CN
L3 1 SEA POTASSIUM/CN
E RUBIDIUM/CN
L4 1 SEA RUBIDIUM/CN
E CESIUM/CN
L5 1 SEA CESIUM/CN
E DIINDIUM TRIOXIDE/CN
L6 1 SEA "DIINDIUM TRIOXIDE"/CN
E DISCANDIUM TRIOXIDE/CN
L7 1 SEA "DISCANDIUM TRIOXIDE"/CN

FILE 'HCA' ENTERED AT 09:36:07 ON 25 SEP 2003

L8 40124 SEA (INTERCALAT? OR DOPE# OR DOPING# OR DOPANT? OR
INTRODUC? OR INSERT? OR INTERSPERS? OR INCORPORAT?) (2A) (A
LK# OR ALKALI# OR (L1 OR L2 OR L3 OR L4 OR L5) OR
LITHIUM# OR LI OR SODIUM# OR NA OR POTASSIUM# OR K OR
RUBIDIUM# OR RB OR CESIUM# OR CS)
L9 10528 SEA L6 OR (INDIUM# OR DIINDIUM#) (W)TRIOXIDE# OR IN2O3
L10 99 SEA (VACAN? OR EMPTY? OR EMPTIED OR UNFILL?) (3A) (LATTIC?
OR SUPERLATTIC? OR MATRIX? OR MATRICE?) (3A) (POINT? OR
PT# OR VERTEX? OR VERTICE?)
L11 3539 SEA L7 OR (SCANDIUM# OR DISCANDIUM#) (W)TRIOXIDE# OR
SC2O3
L12 92 SEA L8 AND L9
L13 5 SEA L12 AND L11
L14 1 SEA L12 AND L10
L15 90332 SEA VACAN? OR EMPTY? OR EMPTIED OR UNFILL?
L16 717425 SEA LATTIC? OR SUPERLATTIC? OR MATRIX? OR MATRICE?
L17 907759 SEA POINT? OR PT# OR VERTEX? OR VERTICE?
L18 18 SEA L12 AND (L15 OR L16 OR L17)

FILE 'REGISTRY' ENTERED AT 09:46:55 ON 25 SEP 2003

L19 6614 SEA (T1 OR T2 OR T3)/PG AND 1/ELC.SUB

FILE 'HCA' ENTERED AT 09:49:53 ON 25 SEP 2003

L20 1790464 SEA L19 OR TRANSITION? (2A) (ELEMENT? OR METAL####)
L21 8030 SEA (INTERCALAT? OR DOPE# OR DOPING# OR DOPANT? OR

INTRODUC? OR INSERT? OR INTERSPERS? OR INCORPORAT?) (2A) L2
0

L22 50 SEA L21 AND L9
L23 6 SEA L12 AND L22
L24 1 SEA L22 AND L11
L25 1 SEA L22 AND L10
L26 12 SEA L22 AND (L15 OR L16 OR L17)
L27 3 SEA L18 AND L26
L28 12 SEA L13 OR L14 OR L23 OR L24 OR L25 OR L27
L29 15 SEA L18 NOT L28
L30 9 SEA L26 NOT (L28 OR L29)

FILE 'REGISTRY' ENTERED AT 09:57:33 ON 25 SEP 2003

E HYDROGEN/CN
L31 1 SEA HYDROGEN/CN
E ZINC MONOXIDE/CN
L32 1 SEA "ZINC MONOXIDE"/CN

FILE 'HCA' ENTERED AT 10:01:35 ON 25 SEP 2003

L33 16627 SEA (INTERCALAT? OR DOPE# OR DOPING# OR DOPANT? OR
INTRODUC? OR INSERT? OR INTERSPERS? OR INCORPORAT?) (2A) (L
31 OR HYDROGEN# OR H OR H2)
L34 115606 SEA L32 OR (ZINC# OR ZN) (W) (OXIDE# OR MONOXIDE#) OR ZNO
L35 63642 SEA HEXAG?

FILE 'REGISTRY' ENTERED AT 10:08:43 ON 25 SEP 2003

L36 7 SEA WURTZITE#

FILE 'HCA' ENTERED AT 10:12:00 ON 25 SEP 2003

L37 5276 SEA L36 OR WURTZITE#
L38 179 SEA L34 AND L33
L39 1 SEA L38 AND L10
L40 9 SEA L38 AND L15
L41 16 SEA L38 AND L16
L42 6 SEA L38 AND L17
L43 0 SEA L38 AND L35
L44 1 SEA L38 AND L37
L45 110 SEA L34 AND L35 AND L37
L46 QUE L31 OR HYDROGEN# OR H2 OR H
L47 11 SEA L45 AND L46
L48 25 SEA L39 OR L40 OR L42 OR L44 OR L47
L49 14 SEA L41 NOT L48

=> file hca

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=> d l28 1-12 cbib abs hitstr hitind

L28 ANSWER 1 OF 12 HCA COPYRIGHT 2003 ACS on STN

139:71602 Additive for alkaline batteries. Christian, Paul A.; Davis, Stuart M.; Mezini, Tatjana (The Gillette Company, USA). PCT Int. Appl. WO 2003054988 A2 20030703, 26 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2002-US39649 20021211. PRIORITY: US 2001-22272 20011220.

AB An alk. battery includes a cathode including Ni oxyhydroxide and a gold salt, an anode including zinc, a separator between the cathode and the anode, and an alk. electrolyte. The Ni oxyhydroxide includes .beta.- and .gamma.-Ni oxyhydroxide. Gold salt is selected from Au(III) oxide, Au(III) hydroxide, and Au(III) acetate.

IT 1312-43-2, India
(additive for alk. batteries)

RN 1312-43-2 HCA

CN Indium oxide (In₂O₃) (6CI, 8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

IT 7439-96-5, Manganese, uses 7440-22-4, Silver, uses
7440-48-4, Cobalt, uses
(dopant; additive for alk. batteries)

RN 7439-96-5 HCA

CN Manganese (8CI, 9CI) (CA INDEX NAME)

Mn

RN 7440-22-4 HCA

CN Silver (8CI, 9CI) (CA INDEX NAME)

Ag

RN 7440-48-4 HCA

CN Cobalt (8CI, 9CI) (CA INDEX NAME)

Co

IC ICM H01M004-52

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

IT 1301-96-8, Silver oxide Ago 1303-52-2, Gold hydroxide au(oh)₃

1303-58-8, Gold oxide au₂o₃ 1303-61-3, Gold sulfide au₂s₃

1304-28-5, Barium oxide (BaO), uses 1304-76-3, Bismuth oxide

(Bi₂O₃), uses 1305-62-0, Calcium hydroxide, uses 1305-78-8,

Calcium oxide, uses 1306-19-0, Cadmium oxide (CdO), uses 1306-38-3, Cerium oxide CeO_2 , uses 1309-42-8, Magnesium hydroxide 1309-48-4, Magnesium oxide (MgO), uses 1309-64-4, Antimony oxide (Sb_2O_3), uses **1312-43-2**, India 1313-13-9, Manganese dioxide, uses 1313-99-1, Nickel oxide (NiO), uses 1314-13-2, Zinc oxide, uses 1314-37-0, Ytterbium 7440-57-5D, Gold, salt 7446-07-3, Tellurium oxide (TeO_2) 7487-88-9, Magnesium sulfate, uses 7681-52-9, Sodium hypochlorite NaOCl 7722-64-7, Potassium permanganate 7727-21-1, Potassium persulfate 7727-43-7, Barium sulfate 7775-27-1, Sodium persulfate 7778-18-9, Calcium sulfate 7783-98-4, Silver permanganate 7787-36-2, Barium permanganate 7789-75-5, Calcium fluoride, uses 7790-75-2, Calcium tungsten oxide CaWO_4 12036-44-1, Thulium oxide 12047-27-7, Barium titanium oxide BaTiO_3 , uses 12049-50-2, Calcium titanium oxide CaTiO_3 12060-58-1, Samaria 12060-59-2, Strontium titanium oxide SrTiO_3 12061-16-4, Erbium 12064-62-9, Gadolinia 12672-51-4, Cobalt hydroxide 13463-67-7, Titania, uses 13773-23-4, Barium iron oxide BaFeO_4 14857-02-4, Calcium silicate CaSi_2O_5 16469-22-0, Yttrium hydroxide 17194-00-2, Barium hydroxide 18480-07-4, Strontium hydroxide 20427-58-1, Zinc hydroxide 20548-54-3, Calcium sulfide (CaS) 20667-12-3, Silver oxide (Ag_2O) 20731-62-8, Thulium sulfate 51305-35-2, Gold acetate 61701-27-7, Cobalt hydroxide oxide

(additive for alk. batteries)

IT 7429-90-5, Aluminum, uses **7439-96-5**, Manganese, uses **7440-22-4**, Silver, uses **7440-48-4**, Cobalt, uses (dopant; additive for alk. batteries)

L28 ANSWER 2 OF 12 HCA COPYRIGHT 2003 ACS on STN

138:82056 SBT-type ferroelectric thin films with improved morphology, their compositions, and formation thereof. Soyama, Nobuyuki; Tokida, Yoshihiko; Nagamine, Kaoru (Mitsubishi Materials Corp., Japan). Jpn. Kokai Tokkyo Koho JP 2003002650 A2 20030108, 17 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2001-263380 20010831. PRIORITY: JP 2000-398250 20001227; JP 2001-115761 20010413.

AB The films, for nonvolatile memories or capacitors, comprise (A) $\text{Sr}_{x-1}\text{Bi}_x\text{Nb}_{1-z}\text{O}_9$ ($0.6 < x < 1.1$; $2.0 \leq z < 2.6$; $0 \leq z \leq 1$) and (B1) compd. oxides of Bi, Si, Pb, Ge, Sn, Al, Ga, In, Mg, Ca, Sr, Ba, V, Nb, Ta, Sc, Y, Ti, Zr, Hf, Cr, Mn, Fe, Co, Ni, Zn, Cd, Li, Na, and/or K or (B2) $(\text{Bi}, \text{La})_2\text{SiO}_5$ [$0 < \text{B2/A (molar ratio)} < 5$] and are formed from org. catalyst solns. of (condensed and hydrolyzed) pyrolytic and/or hydrolyzable organometallic compds. by CSD (chem. soln. deposition) under oxidizing atm. or in the presence of water vapor. The source solns. exhibited low crystn. temp. and thereby improving resulting film morphol. remarkably.

IT **1312-43-2P**, Indium oxide **12060-08-1P**, Scandium oxide

(dopants; SBT ferroelec. films with improved morphol. from organometallic sources contg. sp. dopants)

RN 1312-43-2 HCA

CN Indium oxide (In_2O_3) (6CI, 8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

RN 12060-08-1 HCA
CN Scandium oxide (Sc2O3) (6CI, 8CI, 9CI) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
IC ICM C01G035-00
ICS H01L027-105
CC 76-8 (Electric Phenomena)
Section cross-reference(s): 57
IT 1304-28-5P, Barium oxide, uses 1305-78-8P, Calcia, uses
1306-19-0P, Cadmium oxide, uses 1309-48-4P, Magnesia, uses
1310-53-8P, Germania, uses 1312-43-2P, Indium oxide
1313-59-3P, **Sodium** oxide, uses 1313-96-8P, Niobium oxide
1313-99-1P, Nickel oxide, uses 1314-11-0P, Strontium oxide, uses
1314-13-2P, Zinc oxide, uses 1314-23-4P, Zirconia, uses
1314-36-9P, Yttria, uses 1314-61-0P, Tantalum oxide 1332-29-2P,
Tin oxide 1332-37-2P, Iron oxide, uses 1335-25-7P, Lead oxide
1344-28-1P, Alumina, uses 7631-86-9P, Silica, uses 11099-11-9P,
Vanadium oxide 11104-61-3P, Cobalt oxide 11118-57-3P, Chromium
oxide 11129-60-5P, Manganese oxide 12027-81-5P, Lanthanum
silicon oxide (La2SiO5) 12055-23-1P, Hafnia 12057-24-8P,
Lithium oxide, uses 12060-08-1P, Scandium oxide
12136-45-7P, **Potassium** oxide, uses 13463-67-7P, Titania,
uses 37348-84-8P, Cobalt manganese nickel oxide 51845-85-3P,
Cobalt manganese oxide 64417-98-7P, Yttrium zirconium oxide
96380-60-8P, Scandium yttrium oxide 159747-29-2P, Hafnium yttrium
zirconium oxide 169938-64-1P, Germanium silicon oxide
190143-50-1P, Barium calcium oxide 213026-42-7P, Bismuth silicon
oxide 481035-85-2P, Germanium silicon tin oxide 481035-88-5P,
Barium calcium vanadium oxide 481035-91-0P, Scandium titanium
oxide 481035-94-3P, Lithium potassium sodium oxide
(Li0.67K0.67Na0.67O) 481035-97-6P, Bismuth lanthanum silicon oxide
(**dopants**; SBT ferroelec. films with improved morphol.
from organometallic sources contg. sp. dopants)

L28 ANSWER 3 OF 12 HCA COPYRIGHT 2003 ACS on STN
138:82055 BLT-type ferroelectric thin films with improved morphology,
their formation, and compositions therefor. Soyama, Nobuyuki;
Ishikawa, Masayuki; Nagamine, Kaoru (Mitsubishi Materials Corp.,
Japan). Jpn. Kokai Tokkyo Koho JP 2003002649 A2 20030108, 15 pp.
(Japanese). CODEN: JKXXAF. APPLICATION: JP 2001-263379 20010831.
PRIORITY: JP 2000-398249 20001227; JP 2001-115760 20010413.

AB The films, for nonvolatile memories or capacitors, comprise (A)
(BixLay)4Ti3O12 ($0 < x < 1.3$; $0 \leq y < 1$; $0 \leq z \leq 0.9$) and (B1) compd. oxides of Bi, Si, Pb, Ge, Sn, Al, Ga,
In, Mg, Ca, Sr, Ba, V, Nb, Ta, Sc, Y, Ti, Zr, Hf, Cr, Mn, Fe, Co,
Ni, Zn, Cd, Li, Na, and/or K or (B2) (Bi, La)2SiO5 [$0 < B2/A$ (molar
ratio) < 5] and are formed from org. catalyst solns. of (condensed
and hydrolyzed) pyrolytic and/or hydrolyzable organometallic compds.
by CSD (chem. soln. deposition) under oxidizing atm. or in the
presence of water vapor. The source solns. exhibited low crystn.
temp. and thereby improving resulting film morphol. remarkably.

IT 1312-43-2P, Indium oxide 12060-08-1P, Scandium
oxide

(**dopants**; BLT ferroelec. films with improved morphol.
from organometallic sources contg. sp. dopants)

RN 1312-43-2 HCA
CN Indium oxide (In_2O_3) (6CI, 8CI, 9CI) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
RN 12060-08-1 HCA
CN Scandium oxide (Sc_2O_3) (6CI, 8CI, 9CI) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
IC ICM C01G029-00
ICS H01L027-105
CC 76-8 (Electric Phenomena)
Section cross-reference(s): 57
IT 1304-28-5P, Barium oxide, uses 1305-78-8P, Calcia, uses
1306-19-0P, Cadmium oxide, uses 1307-96-6P, Cobalt oxide, uses
1308-38-9P, Chromia, uses 1309-48-4P, Magnesia, uses 1310-53-8P,
Germania, uses **1312-43-2P**, Indium oxide 1313-59-3P,
Sodium oxide, uses 1313-96-8P, Niobium oxide 1313-99-1P,
Nickel oxide, uses 1314-11-0P, Strontium oxide, uses 1314-13-2P,
Zinc oxide, uses 1314-23-4P, Zirconia, uses 1314-36-9P, Yttria,
uses 1314-61-0P, Tantalum oxide 1332-29-2P, Tin oxide
1332-37-2P, Iron oxide, uses 1335-25-7P, Lead oxide 1344-28-1P,
Alumina, uses 7631-86-9P, Silica, uses 11099-11-9P, Vanadium
oxide 11129-60-5P, Manganese oxide 12024-21-4P, Gallium oxide
12027-81-5P, Lanthanum silicon oxide (La_2SiO_5) 12055-23-1P, Hafnia
12057-24-8P, **Lithium** oxide, uses **12060-08-1P**,
Scandium oxide 12136-45-7P, **Potassium** oxide, uses
13463-67-7P, Titania, uses 37348-84-8P, Cobalt manganese nickel
oxide 51845-85-3P, Cobalt manganese oxide 64417-98-7P, Yttrium
zirconium oxide 111569-09-6P, Scandium zirconium oxide
159747-29-2P, Hafnium yttrium zirconium oxide 169938-64-1P,
Germanium silicon oxide 190143-50-1P, Barium calcium oxide
213026-42-7P, Bismuth silicon oxide 481035-85-2P, Germanium
silicon tin oxide 481035-88-5P, Barium calcium vanadium oxide
481035-91-0P, Scandium titanium oxide 481035-94-3P, Lithium
potassium sodium oxide ($\text{Li}_0.67\text{K}_0.67\text{Na}_0.67\text{O}$) 481035-97-6P, Bismuth
lanthanum silicon oxide

(**dopants**; BLT ferroelec. films with improved morphol.
from organometallic sources contg. sp. dopants)

L28 ANSWER 4 OF 12 HCA COPYRIGHT 2003 ACS on STN
138:82054 PLZT-type ferroelectric thin films having improved morphology,
their formation, and compositions therefor. Soyama, Nobuyuki; Maki,
Kazumasa; Nagamine, Kaoru (Mitsubishi Materials Corp., Japan). Jpn.
Kokai Tokkyo Koho JP 2003002647 A2 20030108, 20 pp. (Japanese).
CODEN: JKXXAF. APPLICATION: JP 2001-263378 20010831. PRIORITY: JP
2000-398248 20001227; JP 2001-115759 20010413.

AB The films, for nonvolatile memories or capacitors, comprise (A)
(PbxLay) ($\text{ZrzTil-z}\text{O}_3$) ($0.9 < x < 1.3$; $0 \leq y < 0.1$; $0 \leq z \leq 0.9$) and (B1) compd. oxides of Bi, Si, Pb, Ge, Sn, Al,
Ga, In, Mg, Ca, Sr, Ba, V, Nb, Ta, Sc, Y, Ti, Zr, Hf, Cr, Mn, Fe,
Co, Ni, Zn, Cd, Li, Na, and/or K or (B2) ($\text{Bi, La}_2\text{SiO}_5$) [$0 < \text{B2/A}$
(molar ratio) < 5] and are formed from org. catalyst solns. of

(condensed and hydrolyzed) pyrolytic and/or hydrolyzable organometallic compds. by CSD (chem. soln. deposition) under oxidizing atm. or in the presence of water vapor. The source solns. exhibited low crystn. temp. and thereby improving resulting film morphol. remarkably.

IT 1312-43-2P, Indium oxide 12060-08-1P, Scandium oxide

(**dopants**; PLZT ferroelec. films with improved morphol. from organometallic sources contg. sp. dopants)

RN 1312-43-2 HCA

CN Indium oxide (In₂O₃) (6CI, 8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

RN 12060-08-1 HCA

CN Scandium oxide (Sc₂O₃) (6CI, 8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

IC ICM C01G025-00

ICS H01L021-316; H01L027-105

CC 76-8 (Electric Phenomena)

Section cross-reference(s): 57

IT 1304-28-5P, Barium oxide, uses 1304-76-3P, Bismuth oxide, uses 1305-78-8P, Calcia, uses 1306-19-0P, Cadmium oxide, uses 1308-38-9P, Chromia, uses 1309-48-4P, Magnesia, uses 1310-53-8P, Germania, uses 1312-43-2P, Indium oxide 1313-59-3P, **Sodium** oxide, uses 1313-96-8P, Niobium oxide 1313-99-1P, Nickel oxide, uses 1314-13-2P, Zinc oxide, uses 1314-23-4P, Zirconia, uses 1314-36-9P, Yttria, uses 1314-61-0P, Tantalum oxide 1332-29-2P, Tin oxide 1344-28-1P, Alumina, uses 7631-86-9P, Silica, uses 11099-11-9P, Vanadium oxide 11104-61-3P, Cobalt oxide 11129-60-5P, Manganese oxide 12027-81-5P, Lanthanum silicon oxide (La₂SiO₅) 12055-23-1P, Hafnia 12057-24-8P, **Lithium** oxide, uses 12060-08-1P, Scandium oxide 12136-45-7P, **Potassium** oxide, uses 12737-27-8P, Chromium iron oxide 37348-84-8P, Cobalt manganese nickel oxide 51845-85-3P, Cobalt manganese oxide 52934-10-8P, Magnesium strontium oxide 64417-98-7P, Yttrium zirconium oxide 96380-60-8P, Scandium yttrium oxide 111569-09-6P, Scandium zirconium oxide 159747-29-2P, Hafnium yttrium zirconium oxide 169938-64-1P, Germanium silicon oxide 190143-50-1P, Barium calcium oxide 213026-42-7P, Bismuth silicon oxide 481035-85-2P, Germanium silicon tin oxide 481035-88-5P, Barium calcium vanadium oxide 481035-91-0P, Scandium titanium oxide 481035-94-3P, Lithium potassium sodium oxide (Li_{0.67}K_{0.67}Na_{0.67}O) 481035-97-6P, Bismuth lanthanum silicon oxide

(**dopants**; PLZT ferroelec. films with improved morphol. from organometallic sources contg. sp. dopants)

L28 ANSWER 5 OF 12 HCA COPYRIGHT 2003 ACS on STN

133:352206 Compound having dopant introduced into **vacant lattice point** while controlling position and

concentration. Kohiki, Shigemi; Kiyoshima, Ryuta; Matsushima, Shigenori; Sasaki, Masakuni (Japan Science and Technology Corporation, Japan). PCT Int. Appl. WO 2000066496 A1 20001109, 43.

pp. DESIGNATED STATES: W: KR, US; RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE. (Japanese). CODEN: PIXXD2. APPLICATION: WO 2000-JP1866 20000327. PRIORITY: JP 1999-123829 19990430.

AB A compd. is obtained by incorporating atoms Cz into **vacant lattice points** of a crystal represented by the general formula AxBy (wherein A is a cation; B is an anion; and x and y satisfy an elec. neutral stoichiometric ratio) while controlling the introduction with respect to position and/or concn. (C is an atom capable of forming an ion which has an arbitrary valence and is introduced into a **vacant lattice point** of the crystal of the compd. AxBy; and z is from 0 to the no. corresponding to the concn. of **vacant lattice points** in AxBy).

IT 7439-88-5, Iridium, properties 7439-89-6, Iron, properties 7439-93-2, Lithium, properties 7439-96-5, Manganese, properties 7439-98-7, Molybdenum, properties 7440-02-0, Nickel, properties 7440-03-1, Niobium, properties 7440-04-2, Osmium, properties 7440-06-4, Platinum, properties 7440-09-7, Potassium, properties 7440-15-5, Rhenium, properties 7440-17-7, Rubidium, properties 7440-18-8, Ruthenium, properties 7440-20-2, Scandium, properties 7440-22-4, Silver, properties 7440-23-5, Sodium, properties 7440-32-6, Titanium, properties 7440-33-7, Tungsten, properties 7440-46-2, Cesium, properties 7440-47-3, Chromium, properties 7440-48-4, Cobalt, properties 7440-50-8, Copper, properties 7440-62-2, Vanadium, properties 7440-65-5, Yttrium, properties 7440-67-7, Zirconium, properties (dopant; compd. having dopant introduced into **vacant lattice point** while controlling position and concn.)

RN 7439-88-5 HCA
CN Iridium (8CI, 9CI) (CA INDEX NAME)

Ir

RN 7439-89-6 HCA
CN Iron (7CI, 8CI, 9CI) (CA INDEX NAME)

Fe

RN 7439-93-2 HCA
CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

RN 7439-96-5 HCA
CN Manganese (8CI, 9CI) (CA INDEX NAME)

Mn

RN 7439-98-7 HCA
CN Molybdenum (8CI, 9CI) (CA INDEX NAME)

Mo

RN 7440-02-0 HCA
CN Nickel (8CI, 9CI) (CA INDEX NAME)

Ni

RN 7440-03-1 HCA
CN Niobium (8CI, 9CI) (CA INDEX NAME)

Nb

RN 7440-04-2 HCA
CN Osmium (8CI, 9CI) (CA INDEX NAME)

Os

RN 7440-06-4 HCA
CN Platinum (8CI, 9CI) (CA INDEX NAME)

Pt

RN 7440-09-7 HCA
CN Potassium (8CI, 9CI) (CA INDEX NAME)

K

RN 7440-15-5 HCA
CN Rhenium (8CI, 9CI) (CA INDEX NAME)

Re

RN 7440-17-7 HCA
CN Rubidium (8CI, 9CI) (CA INDEX NAME)

Rb

RN 7440-18-8 HCA
CN Ruthenium (8CI, 9CI) (CA INDEX NAME)

Ru

RN 7440-20-2 HCA
CN Scandium (8CI, 9CI) (CA INDEX NAME)

Sc

RN 7440-22-4 HCA
CN Silver (8CI, 9CI) (CA INDEX NAME)

Ag

RN 7440-23-5 HCA
CN Sodium (8CI, 9CI) (CA INDEX NAME)

Na

RN 7440-32-6 HCA
CN Titanium (8CI, 9CI) (CA INDEX NAME)

Ti

RN 7440-33-7 HCA
CN Tungsten (8CI, 9CI) (CA INDEX NAME)

W

RN 7440-46-2 HCA
CN Cesium (8CI, 9CI) (CA INDEX NAME)

Cs

RN 7440-47-3 HCA
CN Chromium (8CI, 9CI) (CA INDEX NAME)

Cr

RN 7440-48-4 HCA

CN Cobalt (8CI, 9CI) (CA INDEX NAME)

Co

RN 7440-50-8 HCA

CN Copper (7CI, 8CI, 9CI) (CA INDEX NAME)

Cu

RN 7440-62-2 HCA

CN Vanadium (8CI, 9CI) (CA INDEX NAME)

V

RN 7440-65-5 HCA

CN Yttrium (8CI, 9CI) (CA INDEX NAME)

Y

RN 7440-67-7 HCA

CN Zirconium (8CI, 9CI) (CA INDEX NAME)

Zr

IT 1312-43-2, Indium oxide
(lithium- or copper-doped; compd. having
dopant introduced into vacant lattice
point while controlling position and concn.)

RN 1312-43-2 HCA

CN Indium oxide (In₂O₃) (6CI, 8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

IC ICM C01G001-00

CC 49-5 (Industrial Inorganic Chemicals)

ST vacant lattice point dopant compd

IT 1333-74-0, Hydrogen, properties 7429-90-5, Aluminum, properties
7439-88-5, Iridium, properties 7439-89-6, Iron,
properties 7439-92-1, Lead, properties 7439-93-2,
Lithium, properties 7439-95-4, Magnesium, properties
7439-96-5, Manganese, properties 7439-97-6, Mercury,
properties 7439-98-7, Molybdenum, properties
7440-02-0, Nickel, properties 7440-03-1, Niobium,
properties 7440-04-2, Osmium, properties 7440-06-4
, Platinum, properties 7440-09-7, Potassium,
properties 7440-15-5, Rhenium, properties
7440-17-7, Rubidium, properties 7440-18-8
, Ruthenium, properties 7440-20-2, Scandium, properties
7440-22-4, Silver, properties 7440-23-5,

Sodium, properties 7440-27-9, Terbium, properties 7440-32-6, Titanium, properties 7440-33-7, Tungsten, properties 7440-36-0, Antimony, properties 7440-38-2, Arsenic, properties 7440-41-7, Beryllium, properties 7440-42-8, Boron, properties 7440-43-9, Cadmium, properties 7440-46-2, Cesium, properties 7440-47-3, Chromium, properties 7440-48-4, Cobalt, properties 7440-50-8, Copper, properties 7440-55-3, Gallium, properties 7440-56-4, Germanium, properties 7440-62-2, Vanadium, properties 7440-65-5, Yttrium, properties 7440-66-6, Zinc, properties 7440-67-7, Zirconium, properties 7440-70-2, Calcium, properties 7553-56-2, Iodine, properties 7704-34-9, Sulfur, properties 7723-14-0, Phosphorus, properties 7726-95-6, Bromine, properties 7727-37-9, Nitrogen, properties 7782-41-4, Fluorine, properties 7782-49-2, Selenium, properties 7782-50-5, Chlorine, properties 13494-80-9, Tellurium, properties

(**dopant**; compd. having dopant introduced into **vacant lattice point** while controlling position and concn.)

IT 1314-13-2, Zinc oxide, properties (hydrogen-doped; compd. having dopant introduced into **vacant lattice point** while controlling position and concn.)

IT 1312-43-2, Indium oxide (**lithium-** or copper-doped; compd. having dopant introduced into **vacant lattice point** while controlling position and concn.)

L28 ANSWER 6 OF 12 HCA COPYRIGHT 2003 ACS on STN

131:22295 Chromium-doped oxide glass and their manufacture. Hoshino, Koichi; Shimizu, Makoto; Sudo, Shoichi (Nippon Telegraph and Telephone Corp., Japan). Jpn. Kokai Tokkyo Koho JP 11157871 A2 19990615 Heisei, 14 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1997-318741 19971119.

AB The compns. are Cr-doped SiO₂- and/or GeO₂-based optical amplifying glass contg. light-emitting Cr⁴⁺ and ferromagnetic CrO₂. Preferably, the compns. also contain ZnO, TiO₂, and .gtoreq.1 of Al₂O₃, Ga₂O₃, and In₂O₃. The glass components and Cr dopant are melt in O-contg. atm., gradually cooled to room temp., reheated in O-contg. atm., and gradually cooled again to room temp. to give the compn. The obtained glass compn. is crushed, mixed with rubber or org. polymer binder, and compacted with application of magnetic field in right angle against the pressing direction to give a glass having permanent magnet characteristics. Lasers and optical amplifiers made of the compns. are also claimed.

IT 7440-47-3, Chromium, uses (**dopant**; manuf. of Cr-doped silicate and/or germanate glass contg. Cr⁴⁺ and CrO₂ and their permanent magnets, lasers, and optical amplifiers)

RN 7440-47-3 HCA

CN Chromium (8CI, 9CI) (CA INDEX NAME)

Cr

- IT 1312-43-2, Indium oxide (In_2O_3) 12060-08-1
, Scandium oxide (Sc_2O_3)
(glass contg.; manuf. of Cr-doped silicate and/or germanate glass
contg. Cr^{4+} and CrO_2 and their permanent magnets, lasers, and
optical amplifiers)
- RN 1312-43-2 HCA
CN Indium oxide (In_2O_3) (6CI, 8CI, 9CI) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
- RN 12060-08-1 HCA
CN Scandium oxide (Sc_2O_3) (6CI, 8CI, 9CI) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
- IC ICM C03C004-00
ICS H01S003-17; C03C003-083; C03C004-12
- CC 57-1 (Ceramics)
Section cross-reference(s): 73, 77
- IT 7440-47-3, Chromium, uses
(**dopant**; manuf. of Cr-doped silicate and/or germanate
glass contg. Cr^{4+} and CrO_2 and their permanent magnets, lasers,
and optical amplifiers)
- IT 1304-28-5, Barium oxide (BaO), processes 1304-56-9, Beryllium
oxide (BeO), processes 1305-78-8, Calcium oxide (CaO), processes
1309-48-4, Magnesia, processes 1312-43-2, Indium oxide (In_2O_3)
1312-81-8, Lanthanum oxide (La_2O_3) 1313-59-3,
Sodium oxide, processes 1314-11-0, Strontium oxide (SrO),
processes 1314-13-2, Zinc oxide (ZnO), processes 1314-36-9,
Yttria, processes 1344-28-1, Aluminum oxide (Al_2O_3), processes
12024-21-4, Gallium oxide (Ga_2O_3) 12057-24-8, Lithium oxide
(Li_2O), processes 12060-08-1, Scandium oxide (Sc_2O_3)
12136-45-7, Potassium oxide, processes
13463-67-7, Titanium oxide (TiO_2), processes 18088-11-4, Rubidium
oxide 20281-00-9, Cesium oxide (Cs_2O)
(glass contg.; manuf. of Cr-doped silicate and/or germanate glass
contg. Cr^{4+} and CrO_2 and their permanent magnets, lasers, and
optical amplifiers)
- L28 ANSWER 7 OF 12 HCA COPYRIGHT 2003 ACS on STN
129:285123 A study of diffusion of Li^+ in the [NZP] network.
Bhuvaneswari, G.; Varadaraju, U. V. (Materials Science Research
Centre, Indian Institute of Technology, Madras, 36, India).
Materials Research Society Symposium Proceedings, 527 (Diffusion
Mechanisms in Crystalline Materials), 513-518 (English) 1998.
CODEN: MRSPDH. ISSN: 0272-9172. Publisher: Materials Research
Society.
- AB Li^+ was **incorporated** in the 3-dimensional
-framework of $\text{PbM}_3\text{M}_4\text{P}_3\text{O}_{12}$ by soft chem. method using Bu lithium at
RT. The framework of the [NZP] structure remains intact upon
 Li^+ **insertion** and provides a three dimensional
interstitial pathway for Li^+ ion diffusion.
- IT 1312-43-2, Indium(III) oxide

(for prepn. of lead-trivalent metal-tetravalent-tetravalent metal phosphate)

RN 1312-43-2 HCA

CN Indium oxide (In_2O_3) (6CI, 8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

CC 78-2 (Inorganic Chemicals and Reactions)

Section cross-reference(s): 57, 75, 76

ST **lithium insertion** lead **transition**

metal phosphate; crystal structure lithium lead metal phosphate

IT Crystal structure

(**lattice** parameters of lead-trivalent metal-tetravalent metal phosphates and their **lithium inserted** products)

IT 1308-38-9, Chromium oxide (Cr_2O_3), reactions 1309-37-1, Iron(III) oxide, reactions **1312-43-2**, Indium(III) oxide 1314-23-4, Zirconia, reactions 1317-36-8, Lead(II) oxide, reactions 12055-23-1, Hafnia 13463-67-7, Titania, reactions 18282-10-5, Tin(IV) oxide

(for prepn. of lead-trivalent metal-tetravalent-tetravalent metal phosphate)

IT 7722-76-1, Ammonium dihydrogen phosphate

(for prepn. of lead-trivalent metal-tetravalent-tetravalent metal phosphate and its **lithium insertion** products)

IT 213833-96-6P, Chromium lead tin phosphate ($\text{CrPbSn}(\text{PO}_4)_3$)

213834-02-7P, Iron lead tin phosphate ($\text{FePbSn}(\text{PO}_4)_3$) 213834-06-1P, Indium lead tin phosphate ($\text{InPbSn}(\text{PO}_4)_3$) 213834-11-8P, Chromium hafnium lead phosphate ($\text{CrHfPb}(\text{PO}_4)_3$) 213834-27-6P, Hafnium indium lead phosphate ($\text{HfInPb}(\text{PO}_4)_3$) 213834-33-4P, Chromium lead zirconium phosphate ($\text{CrPbZr}(\text{PO}_4)_3$) 213834-45-8P, Indium lead zirconium phosphate ($\text{InPbZr}(\text{PO}_4)_3$)

(prepn. and crystal **lattice** parameters)

IT 213834-49-2P, Iron lead lithium zirconium phosphate ($\text{FePbLiZr}(\text{PO}_4)_3$)

213834-55-0P, Iron lead lithium titanium phosphate ($\text{FePbLiTi}(\text{PO}_4)_3$)

213834-59-4P, Hafnium iron lead lithium phosphate ($\text{HfFePbLi}(\text{PO}_4)_3$)

213834-64-1P, Indium lead lithium titanium phosphate

($\text{InPbLiTi}(\text{PO}_4)_3$)

(prepn. and effect of **inserted lithium** on

crystal **lattice** parameters and elec. cond.)

IT 61013-32-9P, Iron lead titanium phosphate ($\text{FePbTi}(\text{PO}_4)_3$)

213833-89-7P, Indium lead titanium phosphate ($\text{InPbTi}(\text{PO}_4)_3$)

213834-20-9P, Hafnium iron lead phosphate ($\text{HfFePb}(\text{PO}_4)_3$)

213834-39-0P, Iron lead zirconium phosphate ($\text{FePbZr}(\text{PO}_4)_3$)

(prepn., crystal **lattice** parameters and **lithium** ion **insertion**)

L28 ANSWER 8 OF 12 HCA COPYRIGHT 2003 ACS on STN

129:69557 Method for preparing metal-intercalated fullerene-like chalcogenides. Homyonfer, Moshe; Tenne, Reshef; Feldman, Yishay (Yeda Research and Development Co. Ltd., Israel; Homyonfer, Moshe; Tenne, Reshef; Feldman, Yishay). PCT Int. Appl. WO 9823796 A1 19980604, 43 pp. DESIGNATED STATES: W: BR, CA, CN, IL, JP, KR, RU,

US; RW: AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE. (English). CODEN: PIXXD2. APPLICATION: WO 1997-IL390 19971127. PRIORITY: IL 1996-119719 19961129.

- AB The method for prepg. nanoparticles or nanowhiskers of a M2-doped M1 oxide (M1 is selected from In, Ga, Sn and a transition metal; M2 is any metal), comprises heating a M1 material with water vapor or in a vacuum app. at a base pressure of 10^{-3} to 10^{-5} Torr, or electron beam-evapg. the M1 material with water or with an O-contg. volatile solvent in a vacuum pressure at a base pressure of 10^{-5} to 10^{-6} Torr in the presence of a M2 salt, and recovering the M2-doped M1 oxide from the walls of the vacuum app. The method for prepg. M2-intercalated and/or M2-encaged inorg. fullerene-like (IF) structures (M1, M2 as above) comprises heating a M1 material with water vapor or in a vacuum app. at a base pressure of 10^{-3} to 10^{-5} Torr, or electron beam-evapg. the M1 material with water or with an O-contg. volatile solvent in a vacuum pressure at a base pressure of 10^{-5} to 10^{-6} Torr in the presence of a M2 salt, annealing the M2-doped M1 oxide in a reducing atm. with H_2X gas ($X = S, Se, \text{ or } Te$), and recovering the M2-intercalated and/or M2-encaged IF-like structures of the M1 chalcogenide. Preferably, the M2 salt is selected from alkali metal, alk. earth, and transition metal salts, esp. alkali metal chlorides. The intercalated and/or encaged IF structures are suitable for use as lubricants, and also form stable suspensions, e.g., in alc., and electrophoretic deposition from the suspensions on conductive substrates yields a thin film of intercalated IF-like material, e.g., as photosensitive element in solar cells, for manufg. batteries, in electrochromic devices, and as single-layer film on the tip of scanning probe microscopes. W wire was heated in steam to give WO_3 that was reduced with H_2S to give the sulfide that was **intercalated** with an **alkali** metal chloride to give the IF-like material.
- IT **1312-43-2P**, Indium oxide (In_2O_3)
(**alkali** metal-doped nanoparticles and nanowhiskers, manuf. of; in chalcogenide manuf. for photosensitive element in solar cells, batteries in electrochromic devices, and single-layer film on tip of scanning probe microscopes)
- RN 1312-43-2 HCA
- CN Indium oxide (In_2O_3) (6CI, 8CI, 9CI) (CA INDEX NAME)
- *** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
- IC ICM C30B023-00
ICS C30B029-16; C30B029-46; C30B029-60; H01M004-58; C01G001-12
- CC 49-1 (Industrial Inorganic Chemicals)
Section cross-reference(s): 52, 74
- ST dopant oxide fullerene nanoparticle nanowhisker; sulfidization oxide chalcogenide dopant; indium oxide sulfidization dopant; gallium oxide sulfidization dopant; tin oxide sulfidization dopant; **transition metal** oxide sulfidization **dopant**; metal salt dopant oxide; sulfide salt dopant; selenide salt dopant; telluride salt dopant; **alkali** metal salt **intercalated** chalcogenide; chloride intercalated chalcogenide; tungsten steam oxide nanoparticle nanowhisker;

disulfide oxide sulfidization chalcogenide; electrophoresis film dopant chalcogenide; evapn film intercalated chalcogenide; secondary battery intercalated chalcogenide; solar cell intercalated chalcogenide; electrochromic device intercalated chalcogenide; coating silicon tip intercalated chalcogenide; scanning probe microscope tip coating; solid lubricant intercalated chalcogenide

IT Transition metal oxides

(**alkali** metal-**doped** nanoparticles and nanowhiskers, manuf. of; in chalcogenide manuf. for photosensitive element in solar cells, batteries in electrochromic devices, and single-layer film on tip of scanning probe microscopes)

IT Oxides (inorganic), preparation

(nonstoichiometric, **alkali** metal-**doped** nanoparticles and nanowhiskers, manuf. of; in chalcogenide manuf. for photosensitive element in solar cells, batteries in electrochromic devices, and single-layer film on tip of scanning probe microscopes)

IT **1312-43-2P**, Indium oxide (**In₂O₃**) 1313-27-5P, Molybdenum oxide (**MoO₃**), preparation 1314-28-9P, Rhenium oxide (**ReO₃**) 1314-35-8DP, Tungsten oxide (**WO₃**), oxygen deficient, preparation 1314-35-8P, Tungsten oxide (**WO₃**), preparation 1314-62-1P, Vanadium pentoxide, preparation 11098-99-0P, Molybdenum oxide 12024-21-4P, Gallium oxide 12037-57-9P, Tungsten oxide (**W₁₈O₄₉**) 12440-31-2P, Tungsten oxide (**W₅O₁₄**) 18282-10-5P, Tin oxide (**SnO₂**) 18868-43-4P, Molybdenum oxide (**MoO₂**) 110686-38-9P, Molybdenum tungsten oxide ((**Mo,W**)**O₃**)

(**alkali** metal-**doped** nanoparticles and nanowhiskers, manuf. of; in chalcogenide manuf. for photosensitive element in solar cells, batteries in electrochromic devices, and single-layer film on tip of scanning probe microscopes)

IT 7439-98-7, Molybdenum, reactions 7440-03-1, Niobium, reactions 7440-06-4, Platinum, reactions 7440-15-5, Rhenium, reactions 7440-18-8, Ruthenium, reactions 7440-25-7, Tantalum, reactions 7440-32-6, Titanium, reactions 7440-33-7, Tungsten, reactions 7440-58-6, Hafnium, reactions 7440-62-2, Vanadium, reactions 7440-67-7, Zirconium, reactions

(reaction of; with water vapor, for oxide in **intercalated** fullerene-like **transition metal** chalcogenide nanoparticle and nanowhisker manuf.)

L28 ANSWER 9 OF 12 HCA COPYRIGHT 2003 ACS on STN

118:112453 Properties of doped and undoped crystals of single-domain potassium titanyl arsenate (**KTiOAsO₄**). Cheng, L. K.; Cheng, L. T.; Bierlein, J. D.; Zumsteg, F. C.; Ballman, A. A. (CR and D Sci. Eng. Lab., E. I. Du Pont de Nemours and Co., Inc., Wilmington, DE, 19880-0306, USA). Applied Physics Letters, 62(4), 346-8 (English) 1993. CODEN: APPLAB. ISSN: 0003-6951.

AB Large single crystals of **KTiOAsO₄** (**KTA**) measuring up to 35 .times. 31 .times. 58 mm³ (along abc) are grown from the pure potassium arsenate self-fluxes and from the tungstate flux using the seeded

high-temp. soln. growth technique. Small amts. of Fe₂O₃, Sc₂O₃, or In₂O₃ (.apprx.0.2-0.4%) are added to the melt to promote single-domain formation in the flux-grown crystals. The authors report here the linear optical and nonlinear optical properties of these crystals. They obsd. an unusually strong optical birefringence increase with Fe₂O₃ dopant concn. [$\Delta(n_z - n_x)$.apprx. 0.017/wt.% Fe]. This increase leads to a blue shift in the second-harmonic generation cutoff wavelength of as much as 37 nm for a .apprx. 0.47% Fe-dopant level in KTA.

IT 1312-43-2, Indium sesquioxide 12060-08-1, Scandium sesquioxide

(soln. growth of single-domain single crystals of **potassium** titanyl arsenate **doped** with, from tungstate and self-fluxes)

RN 1312-43-2 HCA

CN Indium oxide (In₂O₃) (6CI, 8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

RN 12060-08-1 HCA

CN Scandium oxide (Sc₂O₃) (6CI, 8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 75, 76

IT Crystal growth

(of **potassium** titanyl arsenate **doped** single-domain crystals, from tungstate and self-fluxes)

IT 1309-37-1, Ferric oxide, properties 1312-43-2, Indium sesquioxide 12060-08-1, Scandium sesquioxide

(soln. growth of single-domain single crystals of **potassium** titanyl arsenate **doped** with, from tungstate and self-fluxes)

L28 ANSWER 10 OF 12 HCA COPYRIGHT 2003 ACS on STN

117:203483 Superconducting oxide materials. Macklin, William James; Moseley, Patrick Timothy (United Kingdom Atomic Energy Authority, UK). Brit. UK Pat. Appl. GB 2249786 A1 19920520, 17 pp. (English). CODEN: BAXXDU. APPLICATION: GB 1991-22495 19911023. PRIORITY: GB 1990-23799 19901101; GB 1991-2039 19910130.

AB The superconducting transition temp. (T_c), of a mixed oxide ceramic contg. Bi together with Cu and .gtoreq.1 elements of Group 2 of the Periodic Table, can be increased by electrochem. intercalation into the ceramic oxide of an alkali metal, such as Li, Na, K, or of a proton (H⁺) or hydronium ion (H₃O⁺).

IT 1312-43-2, Indium oxide 12060-08-1, Scandium oxide (Sc₂O₃)

(ceramic superconductor contg.)

RN 1312-43-2 HCA

CN Indium oxide (In₂O₃) (6CI, 8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

RN 12060-08-1 HCA

CN Scandium oxide (Sc₂O₃) (6CI, 8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

IT 7439-93-2, Lithium, uses 7440-09-7,
Potassium, uses 7440-23-5, Sodium, uses
(intercalation of, in oxide ceramic superconductors)

RN 7439-93-2 HCA

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

RN 7440-09-7 HCA

CN Potassium (8CI, 9CI) (CA INDEX NAME)

K

RN 7440-23-5 HCA

CN Sodium (8CI, 9CI) (CA INDEX NAME)

Na

IC ICM H01L039-12

ICS C04B041-80; C25B001-00; H01M004-48

CC 76-4 (Electric Phenomena)

Section cross-reference(s): 57

ST alkali metal intercalation oxide superconductor;
hydronium ion intercalation oxide superconductor; proton
intercalation oxide superconductor; lithium
intercalation oxide superconductor; sodium
intercalation oxide superconductor; potassium
intercalation oxide superconductor

IT Alkali metals, uses
(intercalation of, in oxide ceramic superconductors)

IT 1312-43-2, Indium oxide 1327-33-9, Antimony oxide
1335-25-7, Lead oxide 12024-21-4, Gallium oxide 12060-08-1
, Scandium oxide (Sc2O3) 12777-38-7, Arsenic oxide
(ceramic superconductor contg.)

IT 7439-93-2, Lithium, uses 7440-09-7,
Potassium, uses 7440-23-5, Sodium, uses
12408-02-5, Hydrogen ion, uses
(intercalation of, in oxide ceramic superconductors)

L28 ANSWER 11 OF 12 HCA COPYRIGHT 2003 ACS on STN

114:10865 Luminescence-spectral properties of trivalent chromium in
oxide glasses. Artsybysheva, I. B.; Lunter, S. G.; Timofeev, N. T.;
Fedorov, Yu. K. (Gos. Opt. Inst. im. Vavilova, USSR). Fizika i
Khimiya Stekla, 16(4), 625-30 (Russian) 1990. CODEN: FKSTD5. ISSN:
0132-6651.

AB Empirical data were obtained for the effect of the compn. of Al, Be,
Mg, Ca, Zn, Sr, Cd, Ba, and Pb phosphate glasses, Li, Na, K, Rb, Cs,
Al, Ga, and In La phosphate glasses, Al, Ga, and In La borate
glasses, and Al and Ga La germanate glasses on the

luminescence-spectral properties of Cr^{3+} (0.01 wt.%) in the glasses. The relation of the Cr^{3+} luminescence quantum yield to the **matrix** structure is interpreted in terms of published concepts of the nature of chem. bonds in glass.

IT 16065-83-1, properties
(**dopant**, in oxide glass, luminescence spectral properties of)

RN 16065-83-1 HCA

CN Chromium, ion (Cr^{3+}) (8CI, 9CI) (CA INDEX NAME)

Cr^{3+}

IT 1312-43-2, Indium oxide (**In2O3**)
(glass, lanthanum borate and phosphate, chromium dopant luminescence in)

RN 1312-43-2 HCA

CN Indium oxide (**In2O3**) (6CI, 8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

CC 57-1 (Ceramics)

Section cross-reference(s): 73

IT Glass, oxide
(lanthanum **lithium** phosphate, chromium **dopant** in, luminescence of)

IT Glass, oxide
(lanthanum **potassium** phosphate, chromium **dopant** in, luminescence of)

IT Glass, oxide
(lanthanum **rubidium** phosphate, chromium **dopant** in, luminescence of)

IT Glass, oxide
(lanthanum **sodium** phosphate, chromium **dopant** in, luminescence of)

IT 16065-83-1, properties
(**dopant**, in oxide glass, luminescence spectral properties of)

IT 1312-43-2, Indium oxide (**In2O3**)
(glass, lanthanum borate and phosphate, chromium dopant luminescence in)

L28 ANSWER 12 OF 12 HCA COPYRIGHT 2003 ACS on STN

100:59646 Electrochromic display devices. (Sanyo Electric Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 57208535 A2 19821221 Showa, 3 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1981-94404 19810617.

AB In an electrochromic display device having a transparent displaying electrode (e.g., **In2O3**), an electrochromic layer (e.g., WO_3), an electrolyte (e.g., LiClO_4 and propylene carbonate), and a counter electrode, the counter electrode is composed of an inclusion compd. of a transition metal chloride (e.g., AgCl) and Li. The above electrochromic display device shows improved stability and durability.

IC G02F001-17; C09K009-00; G09F009-00

- CC 74-9 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)
Section cross-reference(s): 72
- IT **Transition metal** chlorides
(**intercalated** with **lithium**, for electrochromic counter electrodes)
- IT 7783-90-6, uses and miscellaneous
(electrochromic display device with counter electrode contg. **lithium-doped**)

=> d 129 1-15 cbib abs hitstr hitind

L29 ANSWER 1 OF 15 HCA COPYRIGHT 2003 ACS on STN

138:228928 Investigation on photo-damage properties of Mg:In:LiNbO₃ waveguide substrate. Xu, Wusheng; Xu, Shiwen; Wang, Rui; Xu, Yuheng (Department of Electronic Science and Technology, Electro-Optics Information Technology Center, Harbin Institute of Technology, Harbin, 150001, Peop. Rep. China). Guisuanyan Xuebao, 31(1), 5-8 (Chinese) 2003. CODEN: KSYHA5. ISSN: 0454-5648. Publisher: Zhongguo Guisuanyan Xuehui.

AB Crystals of LiNbO₃ doped with 3% MgO and 1% **In₂O₃** (in mole%) were grown by the Czochralski method. After poling, the samples were treated with oxidization or redn. The photo-damage resistance ability of the crystals was measured by the facula distortion method under the wavelength of 488.0 nm. The results show that the photo-damage resistance ability of Mg:In:LiNbO₃ crystals is two orders of magnitude greater than that of LiNbO₃. The mechanism of the enhancement of the photo-damage resistance was investigated by the Li **vacancy** model. The optical waveguide substrates of these crystals were prepd. by the benzoic acid proton exchange method. The photo-damage thresholds of the .gamma.-cut waveguide substrates at the wavelength of 632.8 nm were measured by the m-line method, and the results show that the ability of photo-damage resistance ability of Mg:In:LiNbO₃ waveguide substrates increases two orders of magnitude in comparison with that of pure LiNbO₃.

CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

ST photo damage magnesium indium **doped lithium** niobate optical waveguide

IT 7439-95-4, Magnesium, uses 7440-74-6, Indium, uses
(**lithium** niobate **doped** with; photo-damage properties of Mg:In:LiNbO₃ optical waveguide substrate)

L29 ANSWER 2 OF 15 HCA COPYRIGHT 2003 ACS on STN

137:301498 Crystal growth and luminescence properties of Li₂B₄O₇ single crystals doped with Ce, In, Ni, Cu and Ti ions. Senguttuvan, N.; Ishii, M.; Shimoyama, M.; Kobayashi, M.; Tsutsui, N.; Nikl, M.; Dusek, M.; Shimizu, H. M.; Oku, T.; Adachi, T.; Sakai, K.; Suzuki, J. (Shonan Institute of Technology, Fujisawa, 251-8511, Japan). Nuclear Instruments & Methods in Physics Research, Section A:

Accelerators, Spectrometers, Detectors, and Associated Equipment, 486(1-2), 264-267 (English) 2002. CODEN: NIMAER. ISSN: 0168-9002. Publisher: Elsevier Science B.V..

AB Li2B4O7 (LBO) is considered to be one of the useful materials for neutron detection because it contains Li and B, which possess large neutron capture cross-section isotopes. The authors report crystal growth of LBO doped with Ce, In, Ni, Cu and Ti and some studies on their luminescent properties. Crystals were grown by the Bridgman method using Pt crucibles from the mixt. of LBO with 0.5% of In2O3, NiO, CuO and TiO2. CeO2 was added at 0.1, 1.0 and 2.0% and the crystals were grown in one expt. Though the crystals doped with Ce were not transparent except some small areas, the compd. showed strong emission at 375 nm for two excitation peaks at 270 and 320 nm. The dopant Ce has not entered well into LBO and the transparent area of the crystal did not show any emission. The crystals grown with In2O3 and TiO2 also had lot of segregation with little transparency. The crystals grown with NiO and CuO are highly transparent and clear except some area. The transmittance measured at clear area showed short wavelength cut-off at .apprx.220 nm for the case of NiO doping and at .apprx.200 nm for the case of CuO doping (the cut-off for pure LBO is 167 nm). There were absorption peaks at 440, 500 and 560 nm for Ni-doped LBO and at 240, 255 and 310 nm for Cu doping. Among these two crystals, Cu-doped LBO showed intense emission at 360 nm for the excitation at 245 nm.

IT 1312-43-2, Indium oxide (In2O3)
(dopant source; crystal growth and luminescence properties of Li2B4O7 single crystals doped with Ce, In, Ni, Cu and Ti ions)

RN 1312-43-2 HCA

CN Indium oxide (In2O3) (6CI, 8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 75

ST crystal growth luminescence lithium borate crystal
doping; cerium indium nickel copper titanium ion doping

IT 1312-43-2, Indium oxide (In2O3) 1313-99-1,
Nickel oxide (NiO), uses 1317-38-0, Copper oxide (CuO), uses
13463-67-7, Titanium oxide (TiO2), uses
(dopant source; crystal growth and luminescence properties of Li2B4O7 single crystals doped with Ce, In, Ni, Cu and Ti ions)

L29 ANSWER 3 OF 15 HCA COPYRIGHT 2003 ACS on STN

136:270116 Photodamage of Zn:In:LiNbO3 crystal waveguide substrate. Wang, Rui; Liu, Xinrong; Xu, Wusheng; Wang, Biao (Department of Applied Chemistry and Electro-Optics Technology Center, Harbin Institute of Technology, Harbin, 150001, Peop. Rep. China). Proceedings of SPIE-The International Society for Optical Engineering, 4579(Optical Fiber and Planar Waveguide Technology), 317-321 (English) 2001. CODEN: PSISDG. ISSN: 0277-786X. Publisher: SPIE-The International Society for Optical Engineering.

AB In this research, Czochralski method was used to grow Zn:In:LiNbO3

crystal. The **lattice** const., ultra- visible absorption spectra, IR absorption spectra and photodamage resistance ability of the crystal were measured. The photodamage threshold of LiNbO₃ and Zn:In:LiNbO₃ crystal waveguide substrate were studied by the m-line method. The higher the concns. of In and Zn were doped, the more the absorption band of crystal was shifted to short wave. The OH absorption peak of Zn(3 mol%):In(2 mol%):LiNbO₃ and Zn(3 mol%):In(1 mol%):LiNbO₃ crystal was located at .apprx.3484 cm⁻¹, and that of Zn(3 mol%):In(3 mol%):LiNbO₃ crystal was located at .apprx.3515 cm⁻¹. The photodamage resistance ability of Zn(3 mol%):In(2 mol%):LiNbO₃ crystal was two orders of magnitude higher than that of LiNbO₃ crystal. The photodamage threshold of LiNbO₃ crystal waveguide substrate and Zn:In:LiNbO₃ crystal waveguide substrate were 5 .times. 103J/cm² and 1 .times. 106J/cm², resp.

IT 1312-43-2, Indium oxide
(photodamage of Zn:In:LiNbO₃ crystal waveguide substrate)
RN 1312-43-2 HCA
CN Indium oxide (In₂O₃) (6CI, 8CI, 9CI) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 75
ST photodamage zinc indium **doped lithium** niobate crystal waveguide substrate
IT 1312-43-2, Indium oxide 1314-13-2, Zinc oxide, occurrence
(photodamage of Zn:In:LiNbO₃ crystal waveguide substrate)

L29 ANSWER 4 OF 15 HCA COPYRIGHT 2003 ACS on STN

135:173312 Preparation and characterization of **lithium doped** indium sesqui-oxide. Sasaki, M.; Kiyoshima, R.; Kohiki, S.; Matsushima, S.; Oku, M.; Shishido, T. (Department of Materials Science, Kyusyu Institute of Technology, Kita-kyusyu, 804-8550, Japan). Journal of Alloys and Compounds, 322(1-2), 220-225 (English) 2001. CODEN: JALCEU. ISSN: 0925-8388. Publisher: Elsevier Science S.A..

AB **Doping** of **lithium** into indium sesqui-oxide (In₂O₃) brought about an increase in the **lattice** const. of cubic cell from 10.116 to 10.163 Å and a decrease in the optical absorption energy from 2.72 to 2.68 eV with increasing the nominal molar ratio x (= [Li]/[In₂O₃]) < 0.5. Enlargement of the **lattice** const. obeying the Vegard's law suggests that the **doped Li** atoms occupied interstitial sites of In₂O₃ crystal. Tight-binding (TB) band-structure calcns. with two Li atoms at 8a sites and those at 16c sites of the crystal showed decrements in energy splitting between the valence and conduction bands by 0.2 and 0.1 eV, resp., and supported the obsd. decrements of the optical absorption energy in In₂O₃:Li_x. First-principles mol.-orbital (MO) calcns. with clusters for Li atoms at 8a sites showed similar result to the TB calcn. Changes in the X-ray photoelectron valence band spectra of the In₂O₃:Li_x (x=0, 0.2, and 0.5) agreed with those in the d. of states expected from the TB and MO calcns. Non-linear current-voltage

characteristics were due to the surface states and surface band bending obsd. in the valence band spectra.

IT 1312-43-2, Indium oxide (**In2O3**)
(prepn. and characterization of **lithium doped**
indium sesqui-oxide)

RN 1312-43-2 HCA

CN Indium oxide (**In2O3**) (6CI, 8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

CC 76-2 (Electric Phenomena)

ST **lithium doped** indium oxide prepn elec
characterization

IT Band structure
Crystal structure
Doping
Electric current-potential relationship
Energy level splitting
Optical absorption
Tight-binding method
(prepn. and characterization of **lithium doped**
indium sesqui-oxide)

IT 1312-43-2, Indium oxide (**In2O3**) 7439-93-2,
Lithium, properties
(prepn. and characterization of **lithium doped**
indium sesqui-oxide)

L29 ANSWER 5 OF 15 HCA COPYRIGHT 2003 ACS on STN

134:138328 Efficiency of **Li doping** on electrochromic
WO₃ thin films. Porqueras, I.; Bertran, E. (Departament de Fisica
Aplicada i Optica, Fisica i Enginyeria de Materials Amorfes i
Nanoestructurats (FEMAN), Universitat de Barcelona, Barcelona,
E-08028, Spain). Thin Solid Films, 377-378, 129-133 (English) 2000.
CODEN: THSFAP. ISSN: 0040-6090. Publisher: Elsevier Science S.A..

AB Electrochromic materials show a variation in their optical
properties assocd. with redn./oxidn. reactions and the injection and
extn. of pos. ions in their cryst. **lattice** to keep overall
charge neutrality. **Lithium** was **inserted** into
WO₃ thin films in the gas phase during the deposition process. This
lithium in the solid WO₃ oxidizes, Li .fwdarw. Li⁺ + e⁻, and the
afforded electron plays the role of the reducing agent for the W
atoms. The authors obsd. a clear relation between the amt. of
lithium inserted and the variation of the optical
properties; the highest variation was obtained for
lithium-to-tungsten at. ratios near 0.4. In order to calc. how many
of these ions can be extd. from the layer, and thus how much is
'active' to change the optical properties of the layer, cyclic
voltammetry and chronoamperometry measurements were performed. From
the study of the amt. of **lithium inserted** and
that extd. elec., the efficiency of the doping process was
established. WO₃ samples with lithium-to-tungsten at. ratios
ranging from 0.3 to 0.5 were deposited onto ITO (indium tin oxide)
coated glass. The optical and elec. properties were recorded
simultaneously during the lithium extn. The results showed a slight

redn. of the doping efficiency as the ratio was increased. The authors attempted to find a correlation between the doping ratio and the optical properties of the WO₃ layer. These results help the authors to understand the role of lithium in coloration, and to solve some of the problems assocd. with doping, such as a suitable level, and diffusion of lithium ions in the bulk of the WO₃ layer and to the surface.

IT 7439-93-2, **Lithium**, properties
(**doping** in electrochromic WO₃ thin films in gas phase:
lithium content and optical property and chronoamperometry and
cyclic voltammetry of extd. charge and lithium)
RN 7439-93-2 HCA
CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

IT 1312-43-2, Indium oxide **in2o3**
(**lithium doping** in electrochromic WO₃ films
on Sn-doped **In2O3** layer in gas phase)
RN 1312-43-2 HCA
CN Indium oxide (In₂O₃) (6CI, 8CI, 9CI) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

CC 72-2 (Electrochemistry)
Section cross-reference(s): 73, 74, 78
ST **lithium doping** electrochromic tungsten oxide gas
phase; chronoamperometry extd charge **lithium doped**
electrochromic tungsten oxide; cyclic voltammetry extd charge
lithium doped electrochromic tungsten oxide;
charge extd **lithium doped** tungsten oxide
chronoamperometry cyclic voltammetry

IT Chronoamperometry
Cyclic voltammetry
Electric charge
Electrochromic materials
(**doping** of **lithium** in electrochromic WO₃ thin
films in gas phase: lithium content and optical property and
chronoamperometry and cyclic voltammetry of extd. charge and
lithium)

IT Electrochromism
(of WO₃ films and effect of **lithium doping** in
gas phase)

IT **Doping**
(of **lithium** in electrochromic WO₃ thin films in gas
phase: lithium content and optical property and chronoamperometry
and cyclic voltammetry of extd. charge and lithium)

IT 7439-93-2, **Lithium**, properties
(**doping** in electrochromic WO₃ thin films in gas phase:
lithium content and optical property and chronoamperometry and
cyclic voltammetry of extd. charge and lithium)

IT 50926-11-9, Ito
(**lithium doping** in electrochromic WO₃ films

on ITO layer in gas phase)
IT 7440-31-5, Tin, uses
(**lithium doping** in electrochromic WO₃ films
on Sn-doped In₂O₃ layer in gas phase)
IT 1312-43-2, Indium oxide **in₂o₃**
(**lithium doping** in electrochromic WO₃ films
on Sn-doped In₂O₃ layer in gas phase)
IT 1314-35-8, Tungsten oxide (WO₃), properties
(**lithium doping** in electrochromic WO₃ thin
films in gas phase: lithium content and optical property and
chronoamperometry and cyclic voltammetry of extd. charge and
lithium)

L29 ANSWER 6 OF 15 HCA COPYRIGHT 2003 ACS on STN

133:81391 Ultrafine powders and their use as lasing media. Laine,
Richard M.; Rand, Stephen C.; Hinklin, Thomas; Williams, Guy R. (The
Regents of the University of Michigan, USA). PCT Int. Appl. WO
2000038282 A2 20000629, 41 pp. DESIGNATED STATES: W: AE, AL, AM,
AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM,
EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG,
KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX,
NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ; RW: AT, BE, BF,
BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT,
LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG. (English). CODEN:
PIXXD2. APPLICATION: WO 1999-US28270 19991130. PRIORITY: US
1998-PV110479 19981201.

AB Ultrafine transition metal- and/or rare earth-doped metal oxide
particles are described which exhibit stimulated emission and pulsed
or continuous-wave laser action when energized appropriately (e.g.,
by electron beams). Methods for stimulating laser emission from the
particles is also described. Prodn. of the particles by flame spray
pyrolysis is also described. The use of the particles as laser
media and solid-state lasing systems (e.g., displays, light sources,
etc.) are also described. Particles contg. homogeneously
distributed dopant atoms in concns. greater than the thermodyn. soly.
in the metal oxide **matrix**, and having in some
circumstances unusual oxidn. states, were produced.

IT 7439-93-2P, **Lithium**, uses 7440-23-5P,
Sodium, uses
(**doped** ultrafine powders and their prodn. by flame
spraying and their use as lasing media)

RN 7439-93-2 HCA

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

RN 7440-23-5 HCA

CN Sodium (8CI, 9CI) (CA INDEX NAME)

Na

IT 1312-43-2P, Indium oxide
(**doped** ultrafine powders and their prodn. by flame
spraying and their use as lasing media)

RN 1312-43-2 HCA

CN Indium oxide (In₂O₃) (6CI, 8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

IC H01S003-14

CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related
Properties)
Section cross-reference(s): 57

IT Silicates, uses
(alkali metal and **alk.** earth metal; **doped**
ultrafine powders and their prodn. by flame spraying and their
use as lasing media)

IT 7439-93-2P, **Lithium**, uses 7440-00-8P, Neodymium,
uses 7440-10-0P, Praseodymium, uses 7440-23-5P,
Sodium, uses 7440-45-1P, Cerium, uses 14913-52-1P,
Neodymium +3, uses 18923-26-7P, Cerium +3, uses 22541-14-6P,
Praseodymium +3, uses
(**doped** ultrafine powders and their prodn. by flame
spraying and their use as lasing media)

IT 1303-86-2P, Boron oxide, uses 1312-43-2P, Indium oxide
1314-13-2P, Zinc oxide, uses 1314-36-9P, Yttrium oxide, uses
1314-37-0P, Ytterbium oxide 1332-29-2P, Tin oxide 1335-25-7P,
Lead oxide 1344-28-1P, Alumina, uses 7631-86-9P, Silicon oxide,
uses 13463-67-7P, Titanium dioxide, uses 50926-11-9P, Indium tin
oxide 55957-48-7P, Aluminum **lithium sodium**
oxide 279227-35-9P, Erbium ytterbium yttrium oxide
(Er_{0.16}Yb_{0.12}Y_{1.72}O₃)
(**doped** ultrafine powders and their prodn. by flame
spraying and their use as lasing media)

IT 102-71-6, Triethanolamine, reactions 1067-33-0, Dibutyl tin
diacetate 1310-65-2, **Lithium** hydroxide 1310-73-2,
Sodium hydroxide, reactions 2269-22-9, Aluminum
tri-sec-butoxide 10043-27-3, Terbium nitrate 10045-95-1,
Neodymium nitrate 10108-73-3, Cerium nitrate 10138-01-9,
Europium nitrate 10168-80-6, Erbium nitrate 10168-82-8, Holmium
nitrate 10361-93-0, Yttrium nitrate 12036-05-4, Praseodymium
oxide (Pr₂O₃) 13768-67-7, Ytterbium nitrate 14985-19-4
21645-51-2, Aluminum hydroxide (Al(OH)₃), reactions 21863-06-9,
Alumatrane 25114-58-3, Indium acetate
(**doped** ultrafine powders and their prodn. by flame
spraying and their use as lasing media)

L29 ANSWER 7 OF 15 HCA COPYRIGHT 2003 ACS on STN

132:224826 Lithium manganate and secondary organic electrolyte batteries
using the manganate. Nakai, Kenji; Suzuki, Katsunori (Shin-Kobe
Electric Machinery Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP
2000090915 A2 20000331, 7 pp. (Japanese). CODEN: JKXXAF.
APPLICATION: JP 1998-261695 19980916.

AB **Li intercalating Li** manganate

particles have In, Sb, Sn, W, Mo, Ti, Au, Pt, Pd, Rh, Pb, and/or their oxides, and optionally Ag and/or Ag oxide, fixed on their surface. The batteries use the manganate for their cathodes.

IT 1312-43-2, Indium oxide

(lithium manganate particles with metal or metal oxide coatings for cathodes in secondary lithium batteries)

RN 1312-43-2 HCA

CN Indium oxide (In₂O₃) (6CI, 8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

IC ICM H01M004-02

ICS C01G045-00; H01M004-58; H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

IT 1309-64-4, Antimony oxide (Sb₂O₃), uses 1312-43-2, Indium oxide 1314-35-8, Tungsten oxide, uses 7439-92-1, Lead, uses 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 7440-16-6, Rhodium, uses 7440-32-6, Titanium, uses 7440-57-5, Gold, uses 11098-99-0, Molybdenum oxide 18282-10-5, Tin dioxide 20667-12-3, Silver oxide

(lithium manganate particles with metal or metal oxide coatings for cathodes in secondary lithium batteries)

L29 ANSWER 8 OF 15 HCA COPYRIGHT 2003 ACS on STN

131:38697 Preparation and characterization of In₂O₃:Li_x (x = 0-1.0). Kiyoshima, Ryuta; Kohiki, Shigemitsu; Matsushima, Shigenori; Oku, Masaaki (Department of Materials Science, Faculty of Engineering, Kyusyu Institute of Technology, Kita-kyusyu, 804-8550, Japan). Nippon Kagaku Kaishi (5), 323-327 (Japanese) 1999. CODEN: NKAKB8. ISSN: 0369-4577. Publisher: Nippon Kagakukai.

AB **Li-doped** In oxide crystals (In₂O₃:Li_x, x = 0-1.0) were synthesized by calcination in flowing O of dried powders from aq. solns. of InCl₃ with Li. Only the peaks from cubic In₂O₃ crystal were obsd. in x-ray diffraction (XD). The **lattice** const. increased from 10.116 to 10.163 .ANG., and the optical absorption energy decreased from 2.72 to 2.68 eV with increasing x in In₂O₃:Li_x. The **lattice** const. estd. by XD and the optical absorption edge in UV-visible absorption spectrometry remained at consts. (10.163 .ANG. and 2.68 eV) in the region of x = 0.5-1.0. Tight-binding (TB) band-structure calcns. were performed for studying changes in the electronic structure with **Li doping**. The calcd. energy splitting between the top of the valence band and the bottom of the conduction band decreased by **Li doping** at the **empty** sites (8a and 16c) of pure In₂O₃ crystal, which was consistent with the exptl. decrements of the absorption energy with x in In₂O₃: Li_x. Changes in the valence band spectra by XPS of the In₂O₃: Li_x (x = 0, 0.2 and 1.0) agree with that in the d. of states by the TB calcn. for two **Li** atoms **doped** at 8a or at 16c sites of In₂O₃ crystal. **Doping** of **Li** atoms into the interstitial sites affects both on the valence band and the conduction band min. of the In₂O₃ crystal.

IT 1312-43-2P, Indium sesquioxide

(prepn. and crystal structure and optical absorption edge and band structure)

RN 1312-43-2 HCA

CN Indium oxide (In₂O₃) (6CI, 8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

CC 78-2 (Inorganic Chemicals and Reactions)

Section cross-reference(s): 73, 75

IT 1312-43-2P, Indium sesquioxide 226981-81-3P, Indium lithium oxide (In₂Li_{0.2}O₃) 226981-82-4P, Indium lithium oxide (In₂Li_{0.5}O₃) 226981-83-5P, Indium lithium oxide (In₂LiO₃) 226981-84-6P, Indium lithium oxide (In₂LiO-103)

(prepn. and crystal structure and optical absorption edge and band structure)

L29 ANSWER 9 OF 15 HCA COPYRIGHT 2003 ACS on STN

127:338485 Electrocatalytic reduction of nitrous oxide on metal and oxide electrodes in aqueous solution. Kudo, Akihiko; Mine, Akiyo (Department of Applied Chemistry, Faculty of Science, Science University of Tokyo, 1-3, Kagurazaka, Shinjuku-ku, Tokyo, 162, Japan). Applied Surface Science, 121/122, 538-542 (English) 1997. CODEN: ASUSEE. ISSN: 0169-4332. Publisher: Elsevier.

AB Electrochem. redn. of N₂O was studied using various metal and oxide electrodes. The faradaic efficiency for the N₂O redn. strongly depended on the electrode materials. The metal electrodes whose current-potential curves under N₂O were shifted more pos. than those under Ar showed high faradaic efficiency. Pd electrodes efficiently reduced N₂O to N₂ with the smallest overpotential among the tested metal electrodes. The electrochem. redn. mechanism is considered as follows: (i) the adsorbed oxygen species formed by the decompn. of N₂O is electrochem. reduced on Cu, Ag and Au electrodes, (ii) the surface oxide layers which are formed by N₂O oxidn. giving N₂ are electrochem. reduced on Fe, In, Sn and Pb electrodes, and (iii) the adsorbed N₂O is reduced with adsorbed hydrogen formed by the electrochem. redn. of H⁺ on Pd and Pt electrodes. ZnO, In₂O₃ and SnO₂ semiconductor electrodes also reduced N₂O efficiently.

IT 1312-43-2, Indium oxide in₂o₃

(electrode for redn. of nitrous oxide in aq. soln.)

RN 1312-43-2 HCA

CN Indium oxide (In₂O₃) (6CI, 8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

CC 72-2 (Electrochemistry)

Section cross-reference(s): 66, 67, 76

IT 1312-43-2, Indium oxide in₂o₃ 1314-13-2, Zinc oxide, uses 7439-89-6, Iron, uses 7439-92-1, Lead, uses 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 7440-22-4, Silver, uses 7440-31-5, Tin, uses 7440-50-8, Copper, uses 7440-57-5, Gold, uses 7440-74-6, Indium, uses 18282-10-5, Tin oxide snO₂

(electrode for redn. of nitrous oxide in aq. soln.)

IT 7439-93-2, Lithium, uses

(electrode from lithium-doped NiO for redn.

- of nitrous oxide in aq. soln.)
- IT 1313-99-1, Nickel oxide nio, uses
(electrode **lithium-doped** NiO for redn. of
nitrous oxide in aq. soln.)
- L29 ANSWER 10 OF 15 HCA COPYRIGHT 2003 ACS on STN
- 124:216130 Application solutions for forming coating films and
substrates coated with the films. Koyanagi, Tsuguo; Komatsu,
Michio; Hiraoka, Yukitoshi; Nakai, Mitsuru (Catalysts & Chem Ind Co,
Japan). Jpn. Kokai Tokkyo Koho JP 07286114 A2 19951031 Heisei, 8
pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1994-80461
19940419.
- AB The solns. contain peroxy-polytitanium acids as **matrix**
components dissolved in H2O or org. solvents. The substrates have
the films prepd. from the solns., and are used for photo resists.
- IT 1312-43-2, Indium oxide
(film formable application solns. contg. peroxy-polytitanium acids
for photo resists)
- RN 1312-43-2 HCA
- CN Indium oxide (In2O3) (6CI, 8CI, 9CI) (CA INDEX NAME)
- *** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
- IC ICM C09D001-00
ICS C03C017-25; C08J007-06; C09D005-00; C09D005-24; C23C018-12
- CC 74-6 (Radiation Chemistry, Photochemistry, and Photographic and
Other Reprographic Processes)
- IT 6180-53-6 12070-08-5, Titanium carbide (TiC) 12070-14-3,
Zirconium carbide (ZrC) 12209-99-3, **Sodium** tungstate
(Na2WO3) 16774-21-3
(**dopant**; film formable application solns. contg.
peroxy-polytitanium acids for photo resists)
- IT 1312-43-2, Indium oxide 1332-29-2, Tin oxide 7631-86-9,
Silica, uses 13463-67-7, Titanium oxide, uses 50958-10-6,
Titanium hydroxide oxide peroxide 112540-76-8, Titanium black
(film formable application solns. contg. peroxy-polytitanium acids
for photo resists)
- L29 ANSWER 11 OF 15 HCA COPYRIGHT 2003 ACS on STN
- 124:59996 Ceramic gas sensor materials. Miyayama, Masaru (Res. Cent.
Adv. Sci. Technol., Univ. Tokyo, Tokyo, 153, Japan). Shinsozai,
6(11), 22-5 (Japanese) 1995. CODEN: SSOZEX. ISSN: 0917-0499.
Publisher: Nippon Kogyo Shuppan.
- AB A review with 20 refs. of gas sensors with composite materials and
structures. H2S gas sensors of n-type semiconductor SnO2 system
doped with a metal oxide has better sensitivity than a rare metal
doped SnO2 system, for example, 0.3-0.5 wt% ZnO2 doped SnO2 has a
good sensitivity for 10 ppm H2S at 50-175.degree.. The doping of
basic metal oxides makes sensitivity higher. Each mechanism of the
sensors, Al2O3 doped SnO2, ZrO2 doped SnO2, and CuO doped SnO2 is
discussed. Capacitive CO2 sensors, for example Ag-doped CuO-BaTiO3,
use changes of the depletion layer at p-n junction interfacial.
Similar NOx sensors used NiO-ZnO show sensitivity of more than 10
times change for 100 ppm NOx. To get better selection for gases, a

coating layer is used, for example, SnO₂ sensor coated with amorphous SiO₂, rejects alc., iso-butane etc. and gets better sensitivity for H₂. The Pt/Al₂O₃ coating layer on SnO₂ sensors also reject alc. through its oxidn. A 0.5 wt% Ir/TiO₂ catalyst layer coated In₂O₃-MgO (5 mol%) sensor can catch ammonia with high sensitivity. P-n hetero contact (open-junction), which is a porous junction, of p-CuO doped with Na and n-ZnO shows large increase of current for combustible gases, CO, H₂, etc. The wave no. dependence also can be used as a sensor. A device which has chem. gas sensitivity and some mech. change is developed. Stacking layers of dense PZT (solid soln. of PbZrO₃ and PbTiO₃) and porous ZnO doped 2 mol% Li₂O and 10 mol% NiO fixed with electrodes show for 4000 ppm CO, 4000 ppm H₂, or air changes of 0-1/10-4 of .DELTA.1/1 to elec. field 0-2.5 kV/cm. This is a self-diagnosis sensor.

CC 47-0 (Apparatus and Plant Equipment)
Section cross-reference(s): 57

L29 ANSWER 12 OF 15 HCA COPYRIGHT 2003 ACS on STN
120:90240 Characterization of ITO thin film electrodes in lithium-based systems and their use in electrochromic windows. Golden, S. J.; Steele, B. C. H. (Cent. Microsc. Microanal., Univ. Queensland, St. Lucia, 4072, Australia). Materials Research Society Symposium Proceedings, 293(Solid State Ionics III), 395-400 (English) 1993. CODEN: MRSPDH. ISSN: 0272-9172.

AB Thin films of Sn-doped In₂O₃ (ITO) were produced by radiofrequency sputtering and lithiated electrochem. in LiClO₄-propylene carbonate. X-ray diffraction studies showed a cubic structure with a small increase in the cubic lattice parameter with x .ltoreq. 1 (Li_xITO). Electrochem. studies indicated that Li insertion is reversible, at least over a small no. of cycles. Spectral transmittance decreased slightly with considerable levels of insertion indicating low electrochromic coloration efficiencies and making thin film ITO a suitable counter-electrode material for electrochromic window systems.

IT 7439-93-2, Lithium, reactions
(insertion of, into indium tin oxide)

RN 7439-93-2 HCA

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

IT 1312-43-2, Indium sesquioxide
(lithiated tin-doped, for electrochromic windows)

RN 1312-43-2 HCA

CN Indium oxide (In₂O₃) (6CI, 8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 76

IT 7791-03-9, **Lithium** perchlorate
(**insertion** of, into indium tin oxide)

IT 7439-93-2, **Lithium**, reactions
(**insertion** of, into indium tin oxide)

IT 1312-43-2, Indium sesquioxide
(lithiated tin-doped, for electrochromic windows)

L29 ANSWER 13 OF 15 HCA COPYRIGHT 2003 ACS on STN

110:32064 Effects of dopants on the deep bulk levels in the zinc oxide-bismuth oxide-manganese dioxide system. Shim, Youngjae; Cordaro, James F. (New York State Coll. Ceram., Alfred Univ., Alfred, NY, 14802, USA). Journal of Applied Physics, 64(8), 3994-8 (English) 1988. CODEN: JAPIAU. ISSN: 0021-8979.

AB Small amts. of **In2O3** and **Li2O** were added to the **ZnO-Bi2O3-MnO2** ternary primitive varistor system. Considering Schottky disorder and Frenkel disorder, O **vacancy** or Zn interstitial d. was expected to decrease with **In2O3** doping and to increase with **Li2O** doping. Using admittance spectroscopy, a 0.32-eV electron trap, which is suggested to be an ionized O **vacancy**, was obsd. regardless of the doping conditions. Changes in the peak height, for the 0.32-eV trap, in the admittance spectra are correlated with **In2O3** and **Li2O** doping. Doping with **In2O3** reduces the conductance contribution due to the trap, while doping with **Li2O** enhances it. However, calcns. show that small amts. of dopants, less than 100 ppm, do not greatly influence the trap d. The trap d. remains within exptl. error approx. 1.0 .times. 10¹⁷ cm⁻³.

IT 1312-43-2, Indium sesquioxide
(elec. properties of varistor contg. bismuth sesquioxide and manganese dioxide and zinc oxide and doped with)

RN 1312-43-2 HCA

CN Indium oxide (**In2O3**) (6CI, 8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

CC 76-2 (Electric Phenomena)
Section cross-reference(s): 65

ST bismuth manganese zinc oxide varistor; indium oxide doping trap varistor; **lithium** oxide **doping** deep level varistor

IT Energy level, band structure
Trapping and Traps
(characteristics of, in bismuth oxide-manganese dioxide-zinc oxide varistor, indium oxide or **lithium** oxide **doping** effect on)

IT Electron, conduction
(concn. of, in bismuth oxide-manganese oxide-zinc oxide varistor, indium oxide or **lithium** oxide **doping** effect on)

IT Electric admittance
Electric capacitance
(of bismuth oxide-manganese oxide-zinc oxide varistor, indium oxide or **lithium** oxide **doping** effect on)

IT Energy level

(defect, deep, of bismuth oxide-manganese oxide-zinc oxide varistor, indium oxide or **lithium** oxide **doping** effect on)

- IT Electric resistors
(varistors, bismuth oxide-manganese dioxide-zinc oxide, elec. properties of, indium oxide and **lithium** oxide **doping** effect on)
- IT 1312-43-2, Indium sesquioxide
(elec. properties of varistor contg. bismuth sesquioxide and manganese dioxide and zinc oxide and doped with)
- IT 1314-13-2, Zinc oxide, uses and miscellaneous
(varistor based on bismuth oxide and manganese dioxide and, elec. properties of, indium oxide or **lithium** oxide **doping** effect on)
- IT 1304-76-3, Bismuth sesquioxide, uses and miscellaneous
(varistor based on manganese dioxide and zinc oxide and, elec. properties of, indium oxide and **lithium** oxide **doping** effect on)

L29 ANSWER 14 OF 15 HCA COPYRIGHT 2003 ACS on STN

107:211187 Composite electrode material and devices for use in solid electrolyte devices. Badwal, Sukhvinder Pal Singh (Commonwealth Scientific and Industrial Research Organization, Australia). PCT Int. Appl. WO 8702715 A1 19870507, 56 pp. DESIGNATED STATES: W: AU, JP, US; RW: AT, BE, CH, DE, FR, GB, IT, LU, NL, SE. (English). CODEN: PIXXD2. APPLICATION: WO 1986-AU305 19861015. PRIORITY: AU 1985-3161 19851029.

AB The title material comprises a mixt. of a noble metal (e.g., **Pt**, Ag, Au, Pd, Ir, or Ph) and a semiconducting metal oxide with either electronic (n-type) or hole (p-type) cond. The noble metal portion may be a mixt. or alloy of .gtoreq. 2 of these metals. The oxide is selected from the semiconducting oxides of .gtoreq.1 transition metals (at. nos. 21-30, 39-48, and 72-80), lanthanides (at. nos. 57-71) and actinides (at. nos. 89-96). The oxide component may be a compd. or solid soln. between .gtoreq.1 simple binary metal oxides, or it may be a mixt. of .gtoreq.1 simple metal oxides, compds., or solid solns. The oxide component also contains .gtoreq.1 insulator, ionic conductor or other semiconductor phases. In comparison with metal or metal oxide electrodes, composite electrodes from the title material are better, when used in O sensors due to a lowered operating temp. (e.g., 300.degree.) and when used in other solid electrochem. devices by increasing efficiency and enabling a lower operating temp. These electrodes have resistance to grain growth and better adhesion to the electrolyte surface. These electrode materials may be used for O pumps, fuel cells, electrochem. reactors, and steam electrolyzers to increase efficiency, reduce energy losses, and increase their useful lifetime by operation at lower temps.

IT 1312-43-2
(composite electrodes contg. tin-doped, for solid-electrolyte devices)

RN 1312-43-2 HCA

CN Indium oxide (In_2O_3) (6CI, 8CI, 9CI) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
(composite electrodes contg., for solid-electrolyte devices)
IC ICM C25B011-08
ICS H01M004-92; G01N027-30
CC 79-2 (Inorganic Analytical Chemistry)
Section cross-reference(s): 52, 72
IT 1313-99-1, uses and miscellaneous
(composite electrodes contg. **lithium-doped**,
for solid-electrolyte devices)
IT **1312-43-2**
(composite electrodes contg. tin-doped, for solid-electrolyte
devices)
IT 12016-86-3, Lanthanum cobalt oxide (LaCoO_3) 12017-94-6, Lanthanum
chromium oxide (LaCrO_3) 12031-12-8, Lanthanum manganese oxide
(LaMnO_3) 12031-18-4, Lanthanum nickel oxide (LaNiO_3) 12031-41-3,
Lanthanum nickel oxide (La_2NiO_4) 12036-05-4D, Praseodymium
dioxide, nonstoichiometric 12036-15-6D, Terbium dioxide,
nonstoichiometric 12053-01-9, Chromium niobate (CrNbO_4)
12158-33-7, Chromium uranium oxide (CrUO_4) 12200-56-5, Neodymium
cobalt oxide (NdCoO_3) 12526-47-5 13548-45-3, Chromium vanadate
(CrVO_4) 18282-10-5, Tin dioxide 87139-00-2 106219-17-4D,
oxygen-excess 110584-70-8 110781-49-2 110781-50-5
110781-51-6 110781-52-7 110781-53-8 110781-54-9 110800-84-5
1306-19-0, Cadmium monoxide, uses and miscellaneous 1306-38-3D,
Cerium dioxide, nonstoichiometric, uses and miscellaneous
1307-96-6, Cobalt monoxide, uses and miscellaneous 1308-38-9,
Chromium oxide (Cr_2O_3), uses and miscellaneous 1309-37-1, Iron
oxide (Fe_2O_3), uses and miscellaneous **1312-43-2**, Indium
oxide (**In_2O_3**) 1313-13-9, Manganese dioxide, uses and
miscellaneous 1313-27-5, Molybdenum trioxide, uses and
miscellaneous 1313-99-1, Nickel monoxide, uses and miscellaneous
1314-13-2, Zinc monoxide, uses and miscellaneous 1314-15-4,
Platinum dioxide 1314-35-8, Tungsten trioxide, uses and
miscellaneous 1314-62-1, Vanadium pentoxide, uses and
miscellaneous 1317-61-9, Iron oxide (Fe_3O_4), uses and
miscellaneous 7439-88-5, Iridium, uses and miscellaneous
7440-05-3, Palladium, uses and miscellaneous 7440-06-4, Platinum,
uses and miscellaneous 7440-16-6, Rhodium, uses and miscellaneous
7440-22-4, Silver, uses and miscellaneous 7440-57-5, Gold, uses
and miscellaneous
(composite electrodes contg., for solid-electrolyte devices)
L29 ANSWER 15 OF 15 HCA COPYRIGHT 2003 ACS on STN
95:195102 Solid state electrochromic display. Green, Mino; Kang, Karam
(Dep. Electr. Eng., Imp. Coll. Sci. Technol., London, SW7 2BT, UK).
Solid State Ionics, 3-4, 141-7 (English) 1981. CODEN: SSIOD3.
ISSN: 0167-2738.
AB The fabrication of electrochromic display (ECD) cells involves the
deposition of WO_3 , In-Sn oxide and SiO_2 in thin-film form on a
.beta.-alumina fast ion conductor. The solid electrolyte is thus
the substrate for deposition as well as the medium which optically

isolates the viewing electrode from the counter electrode. The atomistic model of atom insertion into WO₃ is described and the importance of the role of the free electron gas, in electrode potential, atom diffusion and optical absorption, is **pointed** out. The prospects of ECD based on oxide bronzes are considered to be excellent.

- IT 1312-43-2D, solid soln. with tin oxide
(electrochem. solid-state cell contg. **sodium-doped** polycryst. tungsten oxide film and film of, electrochromic effect in)
- RN 1312-43-2 HCA
- CN Indium oxide (In₂O₃) (6CI, 8CI, 9CI) (CA INDEX NAME)
- *** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
- CC 74-8 (Radiation Chemistry, Photochemistry, and Photographic Processes)
- IT Optical display devices
(electrochromic, reversible electrochem. cell contg. **sodium-doped** tungsten oxide film for)
- IT 7631-86-9, properties
(electrochem. cell contg. **sodium-doped** polycryst. tungsten oxide film and film of, electrochromic effect in)
- IT 1312-43-2D, solid soln. with tin oxide 18282-10-5D, solid soln. with indium oxide
(electrochem. solid-state cell contg. **sodium-doped** polycryst. tungsten oxide film and film of, electrochromic effect in)

=> d l30 1-9 cbib abs hitstr hitind

L30 ANSWER 1 OF 9 HCA COPYRIGHT 2003 ACS on STN

138:347995 Detection of nitrogen dioxide using mixed tungsten oxide-based thick film semiconductor sensor. Su, P.-G.; Wu, Ren-Jang; Nieh, Fang-Pei (Tzu-Hui Institute of Technology, 926, Taiwan). Talanta, 59(4), 667-672 (English) 2003. CODEN: TLNTA2. ISSN: 0039-9140. Publisher: Elsevier Science B.V..

AB The thick film semiconductor sensor for NO₂ gas detection was fabricated by screen-printing method using a mixed WO₃-based as sensing material. The sensing characteristics, such as response time, response linearity, sensitivity, working range, cross sensitivity, and long-term stability were further studied by using a WO₃-based mixed with different metal oxides (SnO₂, TiO₂ and **In₂O₃**) and doped with noble metals (Au, Pd and **Pt**) as sensing materials was obsd. The highest sensitivity for low concns. (< 16 mg L⁻¹) was obsd. using WO₃-based mixed with **In₂O₃** or TiO₂. The NO₂ gas sensor showing the fastest response and recovery time (both within 2 min), good linearity (Y = 0.606X + 0.788 R² = 0.991) for gas concns. from 3 to 310 mg L⁻¹, low resistance (3 M.OMEGA.), high sensitivity, undesirable cross sensitivity effect and good long-term stability (at least 120 days) using WO₃-SnO₂-Au as sensing material.

IT 7440-05-3, Palladium, uses 7440-06-4, Platinum,
uses 7440-57-5, Gold, uses
(dopant; nitrogen dioxide detn. using mixed tungsten
oxide-based thick film semiconductor sensor)

RN 7440-05-3 HCA
CN Palladium (8CI, 9CI) (CA INDEX NAME)

Pd

RN 7440-06-4 HCA
CN Platinum (8CI, 9CI) (CA INDEX NAME)

Pt

RN 7440-57-5 HCA
CN Gold (8CI, 9CI) (CA INDEX NAME)

Au

IT 1312-43-2, Indium oxide (In_2O_3)
(nitrogen dioxide detn. using mixed tungsten oxide-based thick
film semiconductor sensor)

RN 1312-43-2 HCA
CN Indium oxide (In_2O_3) (6CI, 8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

CC 79-2 (Inorganic Analytical Chemistry)
Section cross-reference(s): 59, 76

IT 7440-05-3, Palladium, uses 7440-06-4, Platinum,
uses 7440-57-5, Gold, uses
(dopant; nitrogen dioxide detn. using mixed tungsten
oxide-based thick film semiconductor sensor)

IT 1312-43-2, Indium oxide (In_2O_3) 1314-35-8,
Tungsten oxide (WO_3), uses 13463-67-7, Titanium oxide (TiO_2), uses
18282-10-5, Tin oxide (SnO_2)
(nitrogen dioxide detn. using mixed tungsten oxide-based thick
film semiconductor sensor)

L30 ANSWER 2 OF 9 HCA COPYRIGHT 2003 ACS on STN

138:145174 Conductive metal oxide particle, its manufacture, transparent
conductive coating on substrate, and display device. Tawarasako,
Yuji; Hirai, Toshiharu; Komatsu, Michio (Catalysts and Chemicals
Industries Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2003034530
A2 20030207, 13 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP
2001-218522 20010718.

AB The title conductive metal oxide particle contains 0.01-1.5 wt.%
(calcd. as metal) Au, Ag, Pd, Pt, Rh, Ru, Cu, Fe, Ni,
and/or Co for cond. improvement. The metal oxide may be In oxide
doped with Sn, Zn, Zr, or F. The metal oxide particle is manufd. by
following steps; adding and mixing the cond.-improving element to a

soln. dispersed with a precursor (hydroxide) of the metal oxide; hydrothermally treating at 100-250.degree.; drying to give powder; heating the powder under nonoxidizing atm. at 400-650.degree.; and then grinding. Also claimed is a coating soln. contg. the metal oxide particle and a polar solvent. The title substrate is successively formed with a transparent conductive particle layer (L1) and a transparent film having lower refractive index than L1. The title display device is equipped with the substrate at front panel. The metal oxide particle provides low surface resistance, good antistatic property, antireflection property, and electromagnetic shielding property.

IT 7440-67-7, Zirconium, processes
(**dopant**; manuf. of doped indium oxide particle contg.
cond.-improving metal for transparent conductive coating on
substrate in display device)

RN 7440-67-7 HCA

CN Zirconium (8CI, 9CI) (CA INDEX NAME)

Zr

IT 1312-43-2P, Indium oxide
(manuf. of doped indium oxide particle contg. cond.-improving
metal for transparent conductive coating on substrate in display
device)

RN 1312-43-2 HCA

CN Indium oxide (In₂O₃) (6CI, 8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

IC ICM C01G015-00

ICS B05D005-12; B05D007-24; B32B007-02; B32B009-00; H01B001-08;
H01B001-20; H01B005-14

CC 74-13 (Radiation Chemistry, Photochemistry, and Photographic and
Other Reprographic Processes)
Section cross-reference(s): 49

IT 7440-66-6, Zinc, processes 7440-67-7, Zirconium, processes

7782-41-4, Fluorine, processes

(**dopant**; manuf. of doped indium oxide particle contg.
cond.-improving metal for transparent conductive coating on
substrate in display device)

IT 1312-43-2P, Indium oxide 50926-11-9P, ITO
(manuf. of doped indium oxide particle contg. cond.-improving
metal for transparent conductive coating on substrate in display
device)

L30 ANSWER 3 OF 9 HCA COPYRIGHT 2003 ACS on STN

136:142414 Photocatalytic behavior of a new series of In_{0.8}M_{0.2}TaO₄ (M =
Ni, Cu, Fe) photocatalysts in aqueous solutions. Zou, Zhigang; Ye,
Jinhua; Arakawa, Hironori (Photoreaction Control Research Center
(PCRC), National Institute of Advanced Industrial Science and
Technology (AIST), Tsukuba, 305-8563, Japan). Catalysis Letters,
75(3-4), 209-213 (English) 2001. CODEN: CALEER. ISSN: 1011-372X.
Publisher: Kluwer Academic/Plenum Publishers.

AB A new series of photocatalysts, $\text{In}_{0.8}\text{M}_{0.2}\text{TaO}_4$ ($\text{M} = \text{Ni}, \text{Cu}, \text{Fe}$), were synthesized by a solid-state reaction and characterized by powder X-ray diffraction and Rietveld structure refinement. No apparent structural variation has been recognized with the change of doping atoms. However, the rate of H_2 evolution from **Pt** / $\text{CH}_3\text{OH}/\text{H}_2\text{O}$ soln. under UV irradiation significantly changed with the change of doping atoms. $\text{In}_{0.8}\text{Ni}_{0.2}\text{TaO}_4$ showed much higher activity than the non-doped InTaO_4 photocatalyst. Furthermore, we found that under visible light irradiation ($\lambda > 420 \text{ nm}$) $\text{In}_{0.8}\text{Ni}_{0.2}\text{TaO}_4$ exhibited also higher activity than the non-doped InTaO_4 photocatalyst.

IT **1312-43-2**, Indium oxide
(in prepn. of $\text{In}_{0.8}\text{M}_{0.2}\text{TaO}_4$ ($\text{M} = \text{Ni}, \text{Cu}, \text{Fe}$) photocatalytic oxides)

RN 1312-43-2 HCA

CN Indium oxide (In_2O_3) (6CI, 8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

CC 74-1 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)

Section cross-reference(s): 61, 67

ST indium tantalum oxide **doped transition metal** photocatalyst prepn activity; visible light photocatalyst water methanol decompn indium tantalum oxide; photolysis visible light water methanol indium tantalum oxide; hydrogen oxygen prodn indium tantalum oxide visible light photocatalyst

IT 1309-37-1, Iron oxide (Fe_2O_3), reactions **1312-43-2**, Indium oxide 1313-99-1, Nickel oxide, reactions 1314-61-0, Tantalum oxide 1317-38-0, Copper oxide (CuO), reactions
(in prepn. of $\text{In}_{0.8}\text{M}_{0.2}\text{TaO}_4$ ($\text{M} = \text{Ni}, \text{Cu}, \text{Fe}$) photocatalytic oxides)

L30 ANSWER 4 OF 9 HCA COPYRIGHT 2003 ACS on STN

135:36127 **Pt** doping mechanism of vanadium oxide cathode film grown on ITO glass for thin film battery. Kim, Han-Ki; Seong, Tae-Yeon; Jeon, Eun Jeong; Cho, Won I. I.; Yoon, Young Soo (Thin Film Technology Research Center & Battery and Fuel Cell Research Center Korea, Institute of Science and Technology (KIST), Seoul, 136-791, S. Korea). Han'guk Seramik Hakhoechi, 38(1), 100-105 (English) 2001. CODEN: HSHAF7. ISSN: 1229-7801. Publisher: Korean Ceramic Society.

AB An all solid-state thin film battery (TFB) was fabricated by growing, undoped and **Pt**-doped vanadium oxide cathode film (V_2O_5) on **In₂O₃**:Sn coated glass. Room-temp. charge-discharge measurements based on Li/Lipon/ V_2O_5 , full-cell structure with a const. current clearly shows that the **Pt**-doped V_2O_5 , cathode film is superior, in terms of cyclability. X-ray diffraction (XRD) results indicate that the **Pt** doping process induces a more random amorphous structure than an undoped V_2O_5 film. In addn. to its modified structure, the **Pt**-doped V_2O_5 film has a smoother surface than the undoped sample. Compared to an undoped V_2O_5 film, the **Pt**-doped

V2O5 cathode film has a higher electron cond. We hypothesize that the addn. of **Pt** alters electrochem. performance in a manner of making more random amorphous structure and gives an excess electron by replacing the V+5. Possible mechanisms are discussed for the obsd. **Pt** doping effect on structural and electrochem. properties of vanadium oxide cathode films, which are grown on **In2O3:Sn** coated glass.

IT 7440-06-4, Platinum, uses
(**dopant**, vanadium oxide film cathode; effects of **Pt** doping on structure and charge-discharge properties of vanadium oxide cathode film grown on ITO-coated glass for thin film battery)

RN 7440-06-4 HCA

CN Platinum (8CI, 9CI) (CA INDEX NAME)

Pt

CC 57-2 (Ceramics)

Section cross-reference(s): 52

IT Electric discharge
(capacity; effects of **Pt** doping on structure and charge-discharge properties of vanadium oxide cathode film grown on ITO-coated glass for thin film battery)

IT Secondary batteries
(thin film; effects of **Pt** doping on structure and charge-discharge properties of vanadium oxide cathode film grown on ITO-coated glass for thin film battery)

IT Battery cathodes
(vanadium oxide film; effects of **Pt** doping on structure and charge-discharge properties of vanadium oxide cathode film grown on ITO-coated glass for thin film battery)

IT 50926-11-9, Ito
(current collector, thin-film battery; effects of **Pt** doping on structure and charge-discharge properties of vanadium oxide cathode film grown on ITO-coated glass for thin film battery)

IT 7440-06-4, Platinum, uses
(**dopant**, vanadium oxide film cathode; effects of **Pt** doping on structure and charge-discharge properties of vanadium oxide cathode film grown on ITO-coated glass for thin film battery)

IT 344298-74-4, Lithium nitride oxide phosphide ($\text{Li}_{2.18}\text{N}_{0.70}\text{O}_{3.1}\text{P}$)
(electrolyte, thin-film battery; effects of **Pt** doping on structure and charge-discharge properties of vanadium oxide cathode film grown on ITO-coated glass for thin film battery)

IT 1314-62-1, Vanadium oxide (V2O5), processes
(film cathodes; effects of **Pt** doping on structure and charge-discharge properties of vanadium oxide cathode film grown on ITO-coated glass for thin film battery)

133:144263 Investigation of a new catalytic combustion-type CH₄ gas sensor with low power consumption. Sun, Liangyan; Qiu, Fabin; Quan, Baofu (Department of Electronic Engineering, Jilin University, Changchun, 130023, Peop. Rep. China). Sensors and Actuators, B: Chemical, B66(1-3), 289-292 (English) 2000. CODEN: SABCEB. ISSN: 0925-4005. Publisher: Elsevier Science S.A..

AB The sensitive composite material was prepd. by doping Pd and some metal oxides such as MgO into SnO₂-In₂O₃-TiO₂ **matrix** material. The technique for fabricating the direct-heating-type sensor and a surface-modifying process were employed to prep. the CH₄ gas sensor. Its sensitive properties and working mechanism are presented.

IT 7440-05-3, Palladium, analysis
(**dopant**; investigation of a new catalytic combustion-type CH₄ gas sensor with low power consumption)

RN 7440-05-3 HCA

CN Palladium (8CI, 9CI) (CA INDEX NAME)

Pd

IT 1312-43-2, Indium oxide (In₂O₃)
(investigation of a new catalytic combustion-type CH₄ gas sensor based on SnO₂-In₂O₃-TiO₂ **matrix** with low power consumption)

RN 1312-43-2 HCA

CN Indium oxide (In₂O₃) (6CI, 8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

CC 80-2 (Organic Analytical Chemistry)

IT 1309-48-4, Magnesium oxide (MgO), analysis 7440-05-3, Palladium, analysis

(**dopant**; investigation of a new catalytic combustion-type CH₄ gas sensor with low power consumption)

IT 1312-43-2, Indium oxide (In₂O₃) 13463-67-7,
Titanium oxide (TiO₂), analysis 18282-10-5, Tin oxide (SnO₂)
(investigation of a new catalytic combustion-type CH₄ gas sensor based on SnO₂-In₂O₃-TiO₂ **matrix** with low power consumption)

L30 ANSWER 6 OF 9 HCA COPYRIGHT 2003 ACS on STN

128:237737 Microstructure and electrical properties of vanadium-added ITO films. Suzuki, Masakazu; Maeda, Yoriko; Muraoka, Masahiro; Seki, Shigeyuki; Sawada, Yutaka; Matsusita, Junichi (Fac. Eng., Tokyo Inst. Polytech., Atsugi, 243-02, Japan). Tokyo Kogei Daigaku Kogakubu Kiyo, Volume Date 1997, 20(1), 46-51 (Japanese) 1998. CODEN: TOKIDC. ISSN: 0387-6055. Publisher: Tokyo Kogei Daigaku Kogakubu.

AB Microstructure, crystallinity and elec. properties of vanadium-added ITO (In:Sn:V = 93.3:3.7:3.0 at.%) films, which were prepd. using conventional rf magnetron sputtering, were compared with ITO (In:Sn = 97.8:2.2 at.%) films without vanadium. At a substrate temp. of 300.degree., the resistivity (.rho.) of 1.58 .times. 10⁻⁴ .OMEGA. cm

with a carrier d. (n) of $1.03 \times 10^{21} \text{ cm}^{-3}$ and Hall mobility (μ) of $38.3 \text{ cm}^2\text{V}^{-1}\text{s}^{-1}$ was obtained for the vanadium-added ITO film, whereas $\rho = 3.27 \times 10^{-4} \text{ } \Omega\text{cm}$ with $n = 3.99 \times 10^{20} \text{ cm}^{-3}$ and $\mu = 48.0 \text{ cm}^2\text{V}^{-1}\text{s}^{-1}$ was obtained for the ITO film without vanadium addn. The vanadium addn. enhanced the crystallinity and the densification of **In₂O₃ lattice**. The enhanced elec. cond. (increase in the carrier d.) due to vanadium addn. is explained by the increase in the efficiency of Sn doping. The effect of vanadium addn. is similar to that of Ag addn. into ITO films as reported elsewhere by the present authors.

IT 7440-22-4, Silver, uses 7440-62-2, Vanadium, uses
(dopant; microstructure and elec. properties of
vanadium-added ITO films)

RN 7440-22-4 HCA

CN Silver (8CI, 9CI) (CA INDEX NAME)

Ag

RN 7440-62-2 HCA

CN Vanadium (8CI, 9CI) (CA INDEX NAME)

V

CC 76-2 (Electric Phenomena)

Section cross-reference(s): 57, 74, 75

IT 7440-22-4, Silver, uses 7440-62-2, Vanadium, uses
(dopant; microstructure and elec. properties of
vanadium-added ITO films)

L30 ANSWER 7 OF 9 HCA COPYRIGHT 2003 ACS on STN

125:45867 Effect of the Lewis acid strength of doping elements on electronic properties of doped **In₂O₃**. Wen, Shijie; Campet, G.; Hong, Guangyan (Lawrence Berkeley Lab., Berkeley, CA, 94720, USA). Yingyong Huaxue, 13(2), 115-116 (Chinese) 1996. CODEN: YIHUED. ISSN: 1000-0518. Publisher: Yingyong Huaxue Bianji Weiyuanhui.

AB This paper discussed the relation between the electronic properties of doped **In₂O₃** and the Lewis acid strength of doping elements. The authors **pointed** out the key to the choice of appropriate doping elements for improving elec. properties of doped **In₂O₃**. The carrier concn. and mobility of doped **In₂O₃** increased when Ti^{4+} , Ge^{4+} and Sn^{4+} were used as doping elements.

IT 7440-32-6, Titanium, properties
(dopant; effect of Lewis acid strength of doping
elements on electronic properties of doped **In₂O₃**)

RN 7440-32-6 HCA

CN Titanium (8CI, 9CI) (CA INDEX NAME)

Ti

IT 1312-43-2, Indium oxide (**In2O3**)
(effect of Lewis acid strength of doping elements on electronic properties of doped **In2O3**)

RN 1312-43-2 HCA
CN Indium oxide (**In2O3**) (6CI, 8CI, 9CI) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

CC 76-1 (Electric Phenomena)
IT Electric current carriers
(concn. and mobility of; effect of Lewis acid strength of doping elements on electronic properties of doped **In2O3**)

IT Lewis acids
(effect of Lewis acid strength of doping elements on electronic properties of doped **In2O3**)

IT 7440-31-5, Tin, properties 7440-32-6, Titanium, properties
7440-56-4, Germanium, properties
(**dopant**; effect of Lewis acid strength of doping elements on electronic properties of doped **In2O3**)

IT 1312-43-2, Indium oxide (**In2O3**)
(effect of Lewis acid strength of doping elements on electronic properties of doped **In2O3**)

L30 ANSWER 8 OF 9 HCA COPYRIGHT 2003 ACS on STN
123:187044 Bipotentiometric titration with **In2O3** and
Pt/**Ti** electrodes. Radu, Cornel; Blidaru, Ecaterina;
Gheorghe, Marin (Fac. Chem., Univ. Bucharest, Bucharest, Rom.).
Revue Roumaine de Chimie, 40(1), 3-6 (English) 1995. CODEN: RRCHAX.
ISSN: 0035-3930. Publisher: Editura Academiei Romane.

AB Thin conductive films of indium (III) oxide doped with tin (IV) and
platinum onto titanium, prepd. by the authors, were used as redox
electrodes.

IT 7440-06-4, Platinum, uses
(**dopant**; iron bipotentiometric titrn. with cerium using
indium oxide doped with platinum and titanium electrodes)

RN 7440-06-4 HCA
CN Platinum (8CI, 9CI) (CA INDEX NAME)

Pt

IT 1312-43-2, Indium oxide (**In2O3**)
(iron bipotentiometric titrn. with cerium using indium oxide
doped with platinum and titanium electrodes)

RN 1312-43-2 HCA
CN Indium oxide (**In2O3**) (6CI, 8CI, 9CI) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

CC 79-2 (Inorganic Analytical Chemistry)
Section cross-reference(s): 72

IT 7440-06-4, Platinum, uses 7440-31-5, Tin, uses
(**dopant**; iron bipotentiometric titrn. with cerium using

indium oxide doped with platinum and titanium electrodes)
IT 1312-43-2, Indium oxide (In₂O₃)
(iron bipotentiometric titrn. with cerium using indium oxide
doped with platinum and titanium electrodes)

L30 ANSWER 9 OF 9 HCA COPYRIGHT 2003 ACS on STN
122:297774 Sensor for monitoring nitrogen oxides. Potthast, Heidrun;
Schumann, Bernd (Bosch, Robert, G.m.b.H., Germany). Ger. Offen. DE
4334672 A1 19950413, 6 pp. (German). CODEN: GWXXBX. APPLICATION:
DE 1993-4334672 19931012.

AB The sensor for detg. NO_x (NO, NO₂, N₂O₄) in a test gas comprises a
ceramic substrate with semiconductive layer (SnO₂ doped with Ta, Sb,
Nb, W, and In₂O₃ doped with Sn, Ti, Ce) and converter
layer (TiO₂, ZrO₂, SiO₂, Al₂O₃, with 0.01-20 wt.% Pt),
with heating means for the active layers.

IT 7440-03-1, Niobium, uses 7440-25-7, Tantalum, uses
7440-32-6, Titanium, uses 7440-33-7, Tungsten,
uses
(dopant; sensor for monitoring nitrogen oxides)

RN 7440-03-1 HCA
CN Niobium (8CI, 9CI) (CA INDEX NAME)

Nb

RN 7440-25-7 HCA
CN Tantalum (8CI, 9CI) (CA INDEX NAME)

Ta

RN 7440-32-6 HCA
CN Titanium (8CI, 9CI) (CA INDEX NAME)

Ti

RN 7440-33-7 HCA
CN Tungsten (8CI, 9CI) (CA INDEX NAME)

W

IT 1312-43-2, Indium oxide
(sensor for monitoring nitrogen oxides)

RN 1312-43-2 HCA
CN Indium oxide (In₂O₃) (6CI, 8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

IC ICM G01N027-407
ICS F02D035-00

CC 59-1 (Air Pollution and Industrial Hygiene)
Section cross-reference(s): 79

- IT 7440-03-1, Niobium, uses 7440-25-7, Tantalum, uses
7440-31-5, Tin, uses 7440-32-6, Titanium, uses
7440-33-7, Tungsten, uses 7440-36-0, Antimony, uses
7440-45-1, Cerium, uses
(dopant; sensor for monitoring nitrogen oxides)
- IT 1304-28-5, Barium oxide, uses 1305-78-8, Calcium oxide, uses
1309-48-4, Magnesium oxide, uses 1312-43-2, Indium oxide
1314-11-0, Strontium oxide, uses 1314-13-2, Zinc oxide, uses
1314-23-4, Zirconia, uses 1332-29-2, Tin oxide 1344-28-1,
Alumina, uses 7440-05-3, Palladium, uses 7440-06-4, Platinum,
uses 7440-16-6, Rhodium, uses 7631-86-9, Silica, uses
13463-67-7, Titania, uses
(sensor for monitoring nitrogen oxides)

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L48 ANSWER 1 OF 25 HCA COPYRIGHT 2003 ACS on STN

139:205141 **Hexagonal wurtzite** ZnS-rich phosphor powders, their thin films, and low-cost preparation thereof. Okamoto, Shinji; Tanaka, Masaru; Noda, Taiji (Japan Broadcasting Corp., Japan; Japan Science and Technology Corporation). Jpn. Kokai Tokkyo Koho JP 2003246979 A2 20030905, 6 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2002-48551 20020225.

AB The process comprises sulfidation of powd. **hexagonal wurtzite**-type Zn compds. (e.g., oxide, selenide, smithsonite) at 500-1000.degree. in H₂S(g) to prep. phosphor matrixes. Thin films of the phosphors are obtained by formation of layers of the above Zn compds. on transparent substrates at a temp. lower than the transition point of ZnS followed by sulfidation as above.

IT 1314-13-2, **Zinc oxide**, processes
(**hexagonal wurtzite**-type; low-cost manuf. of blue-emitting phosphors contg. **hexagonal wurtzite** ZnS for luminescent screens for FED and VFD)

RN 1314-13-2 HCA

CN Zinc oxide (ZnO) (9CI) (CA INDEX NAME)

O= Zn

IC ICM C09K011-56

ICS C09K011-08; C09K011-88; H01J029-20

CC 74-13 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)

Section cross-reference(s): 57, 73

ST **hexagonal wurtzite** zinc sulfide phosphor manuf; selenide oxide sulfidation phosphor manuf; blue emitting phosphor luminescent screen FED VFD

IT Phosphors

(blue-emitting; low-cost manuf. of blue-emitting phosphors contg. **hexagonal wurtzite** ZnS for luminescent screens for FED and VFD)

IT Sulfidation

(gas-phase; low-cost manuf. of blue-emitting phosphors contg. **hexagonal wurtzite** ZnS for luminescent screens for FED and VFD)

IT Field emission displays

Luminescent screens

(low-cost manuf. of blue-emitting phosphors contg. **hexagonal wurtzite** ZnS for luminescent screens for FED and VFD)

IT Optical imaging devices

(vacuum fluorescent displays; low-cost manuf. of blue-emitting phosphors contg. **hexagonal wurtzite** ZnS for luminescent screens for FED and VFD)

IT 7440-22-4, Silver, uses

(activators; low-cost manuf. of blue-emitting phosphors contg. **hexagonal wurtzite** ZnS for luminescent screens for FED and VFD)

- IT 1314-98-3P, Zinc sulfide, preparation
(**hexagonal wurtzite**-type, activated; low-cost manuf. of blue-emitting phosphors contg. **hexagonal wurtzite** ZnS for luminescent screens for FED and VFD)
- IT 1314-13-2, Zinc oxide, processes
1315-09-9, Zinc selenide 14476-25-6, Zinc spar
(**hexagonal wurtzite**-type; low-cost manuf. of blue-emitting phosphors contg. **hexagonal wurtzite** ZnS for luminescent screens for FED and VFD)
- IT 7783-06-4, **Hydrogen** sulfide, uses
(sulfidation agents; low-cost manuf. of blue-emitting phosphors contg. **hexagonal wurtzite** ZnS for luminescent screens for FED and VFD)

L48 ANSWER 2 OF 25 HCA COPYRIGHT 2003 ACS on STN

139:171754 Preparation and characterization of highly oriented **ZnO** single crystal submicrorod arrays. Guo, Min; Diao, Peng; Ren, Yan-Jie; Wang, Bin; Cai, Sheng-Min (College of Chem. and Mol. Eng., Peking Univ., Beijing, 100871, Peop. Rep. China). Wuli Huaxue Xuebao, 19(5), 478-480 (Chinese) 2003. CODEN: WHXUEU. ISSN: 1000-6818. Publisher: Beijing Daxue Chubanshe.

AB Highly oriented **ZnO** submicrorod arrays were prepd. on SnO₂ conducting glass substrates which were modified with densely packed **ZnO** crystal nucleus. The growth procedure of **ZnO** submicrorod arrays consists of two steps: (1) modification of SnO₂ conducting glass substrates with dispersed **ZnO** crystal nucleus by immersing the substrates into concd. soln., and (2) hydrothermal growth of **ZnO** submicrorods in aq. soln. Scanning electron microscope (SEM), selected area electron diffraction (SAED) and XRD were employed to study the **ZnO** submicrorod arrays. SEM images indicate that **ZnO** **hexagonal** submicrorod arrays grow nearly perpendicularly to the substrates. The diam. and the length of **ZnO** submicrorod are .apprx.400-500 nm and 2 .mu.m for 2 h growth time, resp. Result of SAED reveals that the **ZnO** submicrorod arrays are single-cryst. **hexagonal** rods. XRD shows that the **ZnO** submicrorods are **wurtzite**. The significantly higher intensity obtained from the (002) diffraction peak indicates that the submicrorods are **wurtzite**. The significantly higher intensity obtained from the (002) diffraction peak indicates that the submicrorods are preferentially oriented in the c-axis direction (grown along the [001] crystallog. face direction).

IT 1314-13-2P, Zinc oxide (**ZnO**), properties
(prepn. and properties of highly oriented **zinc oxide** single crystal submicrorod arrays on tin oxide glass substrates)

RN 1314-13-2 HCA

CN Zinc oxide (ZnO) (9CI) (CA INDEX NAME)

O=Zn

- CC 76-2 (Electric Phenomena)
Section cross-reference(s): 75
- ST **zinc oxide** nanorod hydrothermal crystn tin oxide
glass substrate
- IT Glass substrates
Hydrothermal crystallization
Semiconductor nanostructures
Wurtzite-type crystals
(prepn. and properties of highly oriented **zinc oxide** single crystal submicrorod arrays on tin oxide glass substrates)
- IT 7779-88-6, Zinc nitrate
(prepn. and properties of highly oriented **zinc oxide** single crystal submicrorod arrays on tin oxide glass substrates)
- IT 100-97-0, uses
(prepn. and properties of highly oriented **zinc oxide** single crystal submicrorod arrays on tin oxide glass substrates)
- IT 1314-13-2P, **Zinc oxide (ZnO)**,
properties
(prepn. and properties of highly oriented **zinc oxide** single crystal submicrorod arrays on tin oxide glass substrates)
- IT 18282-10-5, Tin oxide (SnO₂)
(prepn. and properties of highly oriented **zinc oxide** single crystal submicrorod arrays on tin oxide glass substrates)

L48 ANSWER 3 OF 25 HCA COPYRIGHT 2003 ACS on STN

139:108003 Passivation of active recombination centers in **ZnO** by **hydrogen doping**. Ohashi, Naoki; Ishigaki, Takamasa; Okada, Nobuhiro; Taguchi, Hiroyuki; Sakaguchi, Isao; Hishita, Shunichi; Sekiguchi, Takashi; Haneda, Hajime (National Institute for Materials Science, Tsukuba, Ibaraki, 305-0044, Japan). Journal of Applied Physics, 93(10, Pt. 1), 6386-6392 (English) 2003. CODEN: JAPIAU. ISSN: 0021-8979. Publisher: American Institute of Physics. ✓

AB The effect of **hydrogen doping** on luminescence properties of **ZnO** was investigated. **Hydrogen** was **incorporated** in the **ZnO** crystal by irradiation with an inductively coupled plasma (ICP), in particular, the pulse modulated mode operation of ICP, and the luminescence spectra and hydrogen concn. of the resultant samples were analyzed. A hydrogenated region of 20-100 nm was formed at the sample surface by the irradiation and the concn. of hydrogen was 10¹⁷-10¹⁸ cm⁻³. **Hydrogen doping** improved the UV emission

efficiency of all the samples, and the degree of improvement depended on the initial state (impurity concn.) of the original samples. The most significant improvements were recorded for the sample lightly contaminated with Cu, Al, and Li. The correlation between impurity concn. and **hydrogen doping** effects is discussed from the viewpoint of charge transfer between hydrogen and the other impurities.

IT 1314-13-2, **Zinc monoxide**, properties
(passivation of active recombination centers in ZnO by **hydrogen doping**)

RN 1314-13-2 HCA

CN Zinc oxide (ZnO) (9CI) (CA INDEX NAME)

O—Zn

CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

ST passivation active recombination center **zinc oxide**
hydrogen doping

IT Cathodoluminescence
Crystal impurities
Crystal **vacancies**
Doping
Luminescence

(passivation of active recombination centers in ZnO by **hydrogen doping**)

IT 7429-90-5, Aluminum, occurrence 7439-93-2, Lithium, occurrence
7440-50-8, Copper, occurrence
(impurity; passivation of active recombination centers in ZnO by **hydrogen doping**)

IT 1333-74-0, Hydrogen, properties
(passivation of active recombination centers in ZnO by **hydrogen doping**)

IT 1314-13-2, **Zinc monoxide**, properties
(passivation of active recombination centers in ZnO by **hydrogen doping**)

L48 ANSWER 4 OF 25 HCA COPYRIGHT 2003 ACS on STN

139:92154 Study on photoluminescence characterization of high-quality nanocrystalline ZnO thin films. Zhang, Xi-Tian; Xiao, Zhi-Yan; Zhang, Wei-Li; Gao, Hong; Wang, Yu-Xi; Liu, Yi-Chun; Zhang, Ji-Ying; Xu, Wu (Department of Physics, Harbin Normal University, Harbin, 150080, Peop. Rep. China). Wuli Xuebao, 52(3), 740-744 (Chinese) 2003. CODEN: WLHPAR. ISSN: 1000-3290. Publisher: Zhongguo Kexueyuan Wuli Yanjiuso.

AB In this paper, we report the photoluminescence from high-quality nanocryst. ZnO thin films. The high-quality nanocryst. ZnO thin films are prepd. by thermal oxidn. of ZnS films at 800 C, which are deposited by low-pressure metal-org. chem. vapor deposition technique. X-ray diffraction indicated that the nanocryst. ZnO thin films have a polycryst.

hexagonal wurtzite structure. A strong UV emission peak at 3.26 eV was obsd. and the deep-level emission band was barely observable at room temp. The strength (.GAMMA.LO) of the exciton-longitudinal-optical (LO) -phonon coupling is deduced from the temp. dependence of the full width at half max. of the fundamental excitonic peak. .GAMMA.LO Is reduced greatly due to the quantum confinement effect.

IT 1314-13-2, **Zinc oxide**, properties
(photoluminescence characterization of high-quality nanocryst.
ZnO thin films)

RN 1314-13-2 HCA

CN Zinc oxide (ZnO) (9CI) (CA INDEX NAME)

O=Zn

CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
ST photoluminescence characterization high quality nanocryst
zinc oxide thin film
IT Exciton
Films
Luminescence
Nanocrystals
X-ray diffraction
(photoluminescence characterization of high-quality nanocryst.
ZnO thin films)

IT Oxidation
(thermal; photoluminescence characterization of high-quality
nanocryst. **ZnO** thin films)

IT 1314-98-3P, Zinc sulfide, processes
(photoluminescence characterization of high-quality nanocryst.
ZnO thin films)

IT 1314-13-2, **Zinc oxide**, properties
(photoluminescence characterization of high-quality nanocryst.
ZnO thin films)

IT 544-97-8, Dimethyl zinc 7783-06-4, **Hydrogen** sulfide,
reactions
(photoluminescence characterization of high-quality nanocryst.
ZnO thin films)

L48 ANSWER 5 OF 25 HCA COPYRIGHT 2003 ACS on STN

138:246274 Electrical and optical characteristics of **ZnO:Al**
thin films. Keum, M. J.; Yang, J. S.; Son, I. H.; Shin, S. K.;
Choi, H. W.; Lee, W. S.; Choi, M. K.; Chu, S. N.; Kim, K. H. (School
of Electrical & Electronic Eng., Kyungwon Univ., Kyunggi-do,
461-701, S. Korea). Materials Research Society Symposium
Proceedings, 730 (Materials for Energy Storage, Generation and
Transport), 155-160 (English) 2002. CODEN: MRSPDH. ISSN:
0272-9172. Publisher: Materials Research Society.

AB **ZnO** with **hexagonal wurtzite** structure
is a wide band gap n-type semiconductor. **ZnO** films can be

prepd. to obtain high transparency in the visible range, low resistivity, chem. stability and stability in H plasma including many foreign materials such as Al, In. The authors prepd. **ZnO:Al** thin film by Facing Targets Sputtering system with Zn metal target and **ZnO:Al**(Al₂O₃ 2%, 4%) ceramic target at total working gas pressure 1 mTorr, substrate temp. R.T. The authors evaluated the crystallog., elec. and optical characteristics of the **ZnO:Al** films.

- CC 76-2 (Electric Phenomena)
Section cross-reference(s): 57, 73
- ST aluminum **zinc oxide** semiconductor film cond
optical
- IT Transparent films
(elec. conductive; sputtering and properties of aluminum **zinc oxide** films)
- IT Electric conductors
(films, transparent; sputtering and properties of aluminum **zinc oxide** films)
- IT Optical transmission
Semiconductor films
Sputtering
(sputtering and properties of aluminum **zinc oxide** films)
- IT 37275-76-6P, Aluminum **zinc oxide**
(sputtering and properties of aluminum **zinc oxide** films)
- IT 7440-37-1, Argon, uses 7782-44-7, Oxygen, uses
(sputtering and properties of aluminum **zinc oxide** films)
- IT 7440-66-6, Zinc, processes
(sputtering target; sputtering and properties of aluminum **zinc oxide** films)

L48 ANSWER 6 OF 25 HCA COPYRIGHT 2003 ACS on STN

138:128390 Structure and optical properties of **ZnO** nanoparticles embedded in SiO₂ prepared by ion implantation and post-thermal annealing. Liu, Yu-xue; Liu, Yi-chun; Shen, De-zhen; Zhong, Guo-zhu; Fan, X. W.; Kong, Xiang-gui (Key Laboratory of Excited State Processes, Changchun Institute of Optics, Fine Mechanics and Physics, Chinese Academy of Science, Changchun, 130022, Peop. Rep. China). Faguang Xuebao, 23(5), 445-450 (Chinese) 2002. CODEN: FAXUEW. ISSN: 1000-7032. Publisher: Kexue Chubanshe.

AB **ZnO** is a versatile semiconductor material with **hexagonal wurtzite** structure and has a band gap of 3.3 eV with a large exciton binding energy of 60 meV at room temp. The structure and optical properties of **ZnO** film has been investigated extensively, but much less is known about the structure and optical properties of **ZnO** nanoparticles embedded in dielec. matrix. By utilizing the wave-guide structure of **ZnO/SiO₂** and the optical properties of quantum dots, **ZnO** nanoparticles embedded in SiO₂ can decrease the intensity of the photon scattering and self-absorption and increase

the UV emission of **ZnO** nanoparticles. High quality **ZnO** nanoparticles embedded in SiO_2 were fabricated by zinc ion implantation (160 keV, 3 .times. 10^{17} cm^{-2}) into optical-grade silica substrate, followed by post-thermal annealing. The dependence of the component, orientation, av. grain size and the quality of **ZnO** nanoparticles on the annealing ambient and time was studied by X-ray diffraction spectra. The zinc ion implantation with high dose and zinc atom diffusion from the silica surface can give rise to micro-holes, weak bonds and broken bonds in silica near the implantation layer. During the annealing process, the disappearance of micro-holes and the reconstruction of weak and broken bonds will occur. High quality **ZnO** nanoparticles embedded in SiO_2 was obtained as the annealing time increased to 2 h at 700.degree.C in oxygen ambient. We can control the av. grain size and d. of **ZnO** nanoparticles by sequential post-thermal annealing of zinc-implanted silica in nitrogen and oxygen ambient at 700.degree.C. The av. grain size of **ZnO** nanoparticles embedded in SiO_2 was in the range of 18-26 nm. The free exciton absorption and UV emission were obsd. by utilizing absorption spectra and micro-photoluminescence spectra at room temp. The exptl. results indicated that the stress affected the free exciton absorption peak of **ZnO** nanoparticles. The dependence of the intense UV emission of **ZnO** nanoparticles on the temp. indicated little impurity containment in the sample. The intense UV emission of **ZnO** nanoparticles can be attributed to the free exciton emission of **ZnO** nanoparticles at room temp. The relatively intense free exciton emission, the weak binding exciton and the free exciton replica emission of **ZnO** nanoparticles can be obsd. at 77 K.

IT 1314-13-2, Zinc oxide (ZnO),
properties
(structure and optical properties of **ZnO** nanoparticles
embedded in SiO_2 prepd. by ion implantation and post-thermal
annealing)
RN 1314-13-2 HCA
CN Zinc oxide (ZnO) (9CI) (CA INDEX NAME)

O= Zn

CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related
Properties)
ST zinc oxide nanoparticle embedded silica
structure optical property; ion implantation zinc silica exciton
photoluminescence UV emission; annealing zinc ion implanted silica
exciton photoluminescence UV emission
IT UV absorption
(UV-visible; structure and optical properties of **ZnO**
nanoparticles embedded in SiO_2 prepd. by ion implantation and
post-thermal annealing)
IT Annealing
Exciton luminescence

Grain size

Ion implantation

Nanoparticles

(structure and optical properties of **ZnO** nanoparticles embedded in SiO₂ prepd. by ion implantation and post-thermal annealing)

IT 1314-13-2, **Zinc oxide (ZnO)**,
properties

(structure and optical properties of **ZnO** nanoparticles embedded in SiO₂ prepd. by ion implantation and post-thermal annealing)

IT 7631-86-9, Silica, uses

(structure and optical properties of **ZnO** nanoparticles embedded in SiO₂ prepd. by ion implantation and post-thermal annealing)

L48 ANSWER 7 OF 25 HCA COPYRIGHT 2003 ACS on STN

137:240268 n-type doping of oxides by hydrogen. Kilic, Cetin; Zunger, Alex (National Renewable Energy Laboratory, Golden, CO, 80401, USA). Applied Physics Letters, 81(1), 73-75 (English) 2002. CODEN: APPLAB. ISSN: 0003-6951. Publisher: American Institute of Physics.

AB First-principles total-energy calcns. suggest that interstitial hydrogen impurity forms a shallow donor in SnO₂, CdO, and **ZnO**, but a deep donor in MgO. The authors generalize this result to other oxides by recognizing that there exist a hydrogen pinning level at .apprx.3.0 .+-. 0.4 eV below vacuum. Materials such as Ag₂O, HgO, CuO, PbO, **PtO**, IrO₂, RuO₂, PbO₂, TiO₂, WO₃, Bi₂O₃, Cr₂O₃, Fe₂O₃, Sb₂O₃, Nb₂O₅, Ta₂O₅, FeTiO₃, and PbTiO₃, whose conduction band min. (CBM) lie below this level (i.e., electron affinity>3.0 .+-. 0.4 eV) will become conductive once **hydrogen** is **incorporated** into the lattice, without reducing the host. Conversely, materials such as BaO, NiO, SrO, HfO₂, and Al₂O₃, whose CBM lie above this level (i.e., electron affinity<3.0 .+-. 0.4 eV) will remain nonconductive since hydrogen forms a deep impurity.

IT 1314-13-2, **Zinc oxide (ZnO)**,
properties

(effect of interstitial hydrogen impurities on donor levels in oxide semiconductors)

RN 1314-13-2 HCA

CN Zinc oxide (ZnO) (9CI) (CA INDEX NAME)

O=Zn

CC 76-3 (Electric Phenomena)

IT 1306-19-0, Cadmium oxide (CdO), properties 1309-48-4, Magnesium oxide (MgO), properties 1314-13-2, **Zinc oxide (ZnO)**, properties 1333-74-0, Hydrogen, properties 18282-10-5, Tin oxide (SnO₂)
(effect of interstitial hydrogen impurities on donor levels in oxide semiconductors)

L48 ANSWER 8 OF 25 HCA COPYRIGHT 2003 ACS on STN

136:271128 Production and properties of p-n junctions in reactively sputtered **ZnO**. Tuzemen, S.; Xiong, Gang; Wilkinson, John; Mischuck, Brian; Ucer, K. B.; Williams, R. T. (Department of Physics, Wake Forest University, Winston-Salem, NC, 27109, USA). Physica B: Condensed Matter (Amsterdam, Netherlands), 308-310, 1197-1200 (English) 2001. CODEN: PHYBE3. ISSN: 0921-4526. Publisher: Elsevier Science B.V..

AB In order to develop electroluminescent and laser devices based on the UV exciton emission of **ZnO**, it will be important to fabricate good p-n junctions. As-grown **ZnO** is normally n-type because of intrinsic donor defects such as oxygen **vacancies** and zinc interstitials, or unintended hydrogen. Making p-type **ZnO** has been more difficult, possibly due to self-compensation by easily formed donor defects. In this work, we demonstrate that reactively sputtered, annealed **ZnO** films can be changed from n-type to moderate p-type by adjusting the oxygen/argon ratio in the sputtering plasma. We report the properties of p-n homojunctions fabricated in this way, and characterize transport in the films by the Hall measurements. Ohmic contacts were formed by deposition of Au/Al films. Our finding of p-type cond. in apparently intrinsic **ZnO** formed by reactive sputtering is not inconsistent with calcd. defect formation enthalpies if account is taken of the higher chem. potential of the dissoecd. oxygen reservoir represented by the sputter plasma, compared to the mol. oxygen reservoir assumed in the calcn. of formation enthalpies. If hydrogen turns out to be the main compensating donor, the role of oxygen pressure in controlling **incorporation** of background **hydrogen** during sputtering may also be implicated.

IT 1314-13-2, Zinc oxide (**ZnO**),
properties

(prodn. and properties of p-n junctions in reactively sputtered **ZnO**)

RN 1314-13-2 HCA

CN Zinc oxide (**ZnO**) (9CI) (CA INDEX NAME)

O==Zn

CC 76-2 (Electric Phenomena)

ST **zinc oxide** reactive sputtering pn junction
property

IT Electric contacts

(formation of ohmic contacts on reactively sputtered **ZnO**
by deposition of Au/Al films)

IT Reactive sputtering

p-n Semiconductor junctions

(prodn. and properties of p-n junctions in reactively sputtered **ZnO**)

IT Electric transport properties

Hall effect

(transport properties in reactively sputtered **ZnO** films
by Hall measurements)

IT 7429-90-5, Aluminum, uses 7440-57-5, Gold, uses
(formation of ohmic contacts on reactively sputtered **ZnO**
by deposition of Au/Al films)

IT 1314-13-2, **Zinc oxide (ZnO)**,
properties

(prodn. and properties of p-n junctions in reactively sputtered
ZnO)

L48 ANSWER 9 OF 25 HCA COPYRIGHT 2003 ACS on STN

135:249874 Controlling the conductivity of wide-band-gap semiconductors.
Van de Walle, Chris G.; Neugebauer, J. (Xerox Palo Alto Research
Center, Palo Alto, CA, 94304, USA). Springer Proceedings in
Physics, 87(Proceedings of the 25th International Conference on the
Physics of Semiconductors, 2000, Part I), 3-8 (English) 2001.
CODEN: SPPPEL. ISSN: 0930-8989. Publisher: Springer-Verlag.

AB Wide-band-gap semiconductors often exhibit limitations in the
ability to control n-type or p-type doping. A theor. framework is
presented for studying doping of semiconductors, with key parameters
derived from first-principles calcns. The formalism is illustrated
with examples for GaN and **ZnO**, where increased
understanding can lead to improved control of doping through defect
and impurity engineering.

IT 1314-13-2, **Zinc oxide**, properties
(controlling the cond. of wide-band-gap semiconductors)

RN 1314-13-2 HCA

CN Zinc oxide (ZnO) (9CI) (CA INDEX NAME)

O=Zn

IT 1333-74-0, **Hydrogen**, uses
(**dopant**; controlling the cond. of wide-band-gap
semiconductors)

RN 1333-74-0 HCA

CN Hydrogen (8CI, 9CI) (CA INDEX NAME)

H-H

CC 76-1 (Electric Phenomena)

IT Chemical potential

Crystal defects

Crystal impurities

Crystal **vacancies**

Doping

Electric conductivity

Fermi level

Semiconductor materials

Total energy

- (controlling the cond. of wide-band-gap semiconductors)
- IT 1314-13-2, **Zinc oxide**, properties
25617-97-4, Gallium nitride
(controlling the cond. of wide-band-gap semiconductors)
- IT 1333-74-0, **Hydrogen**, uses
(**dopant**; controlling the cond. of wide-band-gap semiconductors)
- L48 ANSWER 10 OF 25 HCA COPYRIGHT 2003 ACS on STN ✓
134:93925 Effects of hydrogen on the structural and electrooptical properties of **zinc oxide** thin films. Kang, Youn-Seon; Kim, Hae-Yeol; Lee, Jai-Young (Department of Materials Science and Engineering, Korea Advanced Institute of Science and Technology, Taejon, 305-701, S. Korea). Journal of the Electrochemical Society, 147(12), 4625-4629 (English) 2000. CODEN: JESOAN. ISSN: 0013-4651. Publisher: Electrochemical Society.
- AB **Hydrogen-doped zinc oxide** (**ZnO:H**) films have been deposited by radio-frequency reactive magnetron sputtering and then heat-treated at fixed temp. The role of hydrogen on the transparent conducting properties as well as on microstructural evolution have been investigated. It is identified from x-ray diffraction patterns that as the hydrogen content increases in the sputtering gas, the **ZnO:H** films have a mixed orientation composed of (10.hivin.10), (10.hivin.11), and (11.hivin.20) peaks rather than the (0002) preferred orientation, regardless of heat-treatment. As the content increases, the films also exhibit increasingly irregular surface morphol. and collapsed columnar subsurface regions. In so far as bonding characteristics are concerned, XPS analyses show that O-H hydroxyl bonds are formed during **hydrogen doping** and the bonds are retained after heat-treatment at 500.degree.. In the range of 0-8% hydrogen in the sputtering gas, it is obsd. from Hall measurements that the elec. resistivity decreases sharply with increasing amt. of hydrogen. A main factor improving the elec. properties is found to be **hydrogen incorporation** rather than oxygen **vacancies** or zinc interstitials. Beyond 8 vol% hydrogen, the elec. properties are again deteriorated due to the decrease of electron mobility, which may be understood in terms of the degrdn. of structural properties caused by hydrogen. Meanwhile, it is also found that av. optical transmittance values show a similar trend as the elec. resistivity values vs. hydrogen contents.
- IT 1314-13-2, **Zinc oxide**, properties
(effects of hydrogen on structural and electrooptical properties of **zinc oxide** thin films)
- RN 1314-13-2 HCA
CN Zinc oxide (ZnO) (9CI) (CA INDEX NAME)

O—Zn

CC 76-3 (Electric Phenomena)
ST **hydrogen doped zinc oxide**

- electrooptical property
IT Electrooptical effect
Optical absorption
(effects of hydrogen on structural and electrooptical properties of **zinc oxide** thin films)
IT 1333-74-0, Hydrogen, uses
(effects of hydrogen on structural and electrooptical properties of **zinc oxide** thin films)
IT 1314-13-2, **Zinc oxide**, properties
(effects of hydrogen on structural and electrooptical properties of **zinc oxide** thin films)

L48 ANSWER 11 OF 25 HCA COPYRIGHT 2003 ACS on STN ✓

133:352206 Compound having dopant introduced into **vacant lattice point** while controlling position and concentration. Kohiki, Shigemi; Kiyoshima, Ryuta; Matsushima, Shigenori; Sasaki, Masakuni (Japan Science and Technology Corporation, Japan). PCT Int. Appl. WO 2000066496 A1 20001109, 43 pp. DESIGNATED STATES: W: KR, US; RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE. (Japanese). CODEN: PIXXD2. APPLICATION: WO 2000-JP1866 20000327. PRIORITY: JP 1999-123829 19990430.

AB A compd. is obtained by incorporating atoms Cz into **vacant lattice points** of a crystal represented by the general formula AxBy (wherein A is a cation; B is an anion; and x and y satisfy an elec. neutral stoichiometric ratio) while controlling the introduction with respect to position and/or concn. (C is an atom capable of forming an ion which has an arbitrary valence and is introduced into a **vacant lattice point** of the crystal of the compd. AxBy; and z is from 0 to the no. corresponding to the concn. of **vacant lattice points** in AxBy).

IT 1333-74-0, Hydrogen, properties
(dopant; compd. having dopant introduced into **vacant lattice point** while controlling position and concn.)

RN 1333-74-0 HCA

CN Hydrogen (8CI, 9CI) (CA INDEX NAME)

H-H

IT 1314-13-2, **Zinc oxide**, properties
(hydrogen-doped; compd. having dopant introduced into **vacant lattice point** while controlling position and concn.)

RN 1314-13-2 HCA

CN Zinc oxide (ZnO) (9CI) (CA INDEX NAME)

O=Zn

IC ICM C01G001-00
CC 49-5 (Industrial Inorganic Chemicals)
ST **vacant lattice point** dopant compd
IT **1333-74-0, Hydrogen**, properties 7429-90-5,
Aluminum, properties 7439-88-5, Iridium, properties 7439-89-6,
Iron, properties 7439-92-1, Lead, properties 7439-93-2, Lithium,
properties 7439-95-4, Magnesium, properties 7439-96-5,
Manganese, properties 7439-97-6, Mercury, properties 7439-98-7,
Molybdenum, properties 7440-02-0, Nickel, properties 7440-03-1,
Niobium, properties 7440-04-2, Osmium, properties 7440-06-4,
Platinum, properties 7440-09-7, Potassium, properties 7440-15-5,
Rhenium, properties 7440-17-7, Rubidium, properties 7440-18-8,
Ruthenium, properties 7440-20-2, Scandium, properties 7440-22-4,
Silver, properties 7440-23-5, Sodium, properties 7440-27-9,
Terbium, properties 7440-32-6, Titanium, properties 7440-33-7,
Tungsten, properties 7440-36-0, Antimony, properties 7440-38-2,
Arsenic, properties 7440-41-7, Beryllium, properties 7440-42-8,
Boron, properties 7440-43-9, Cadmium, properties 7440-46-2,
Cesium, properties 7440-47-3, Chromium, properties 7440-48-4,
Cobalt, properties 7440-50-8, Copper, properties 7440-55-3,
Gallium, properties 7440-56-4, Germanium, properties 7440-62-2,
Vanadium, properties 7440-65-5, Yttrium, properties 7440-66-6,
Zinc, properties 7440-67-7, Zirconium, properties 7440-70-2,
Calcium, properties 7553-56-2, Iodine, properties 7704-34-9,
Sulfur, properties 7723-14-0, Phosphorus, properties 7726-95-6,
Bromine, properties 7727-37-9, Nitrogen, properties 7782-41-4,
Fluorine, properties 7782-49-2, Selenium, properties 7782-50-5,
Chlorine, properties 13494-80-9, Tellurium, properties
(**dopant**; compd. having dopant introduced into
vacant lattice point while
controlling position and concn.)
IT **1314-13-2, Zinc oxide**, properties
(**hydrogen-doped**; compd. having dopant
introduced into **vacant lattice point**
while controlling position and concn.)
IT 1312-43-2, Indium oxide
(lithium- or copper-doped; compd. having dopant introduced into
vacant lattice point while
controlling position and concn.)

L48 ANSWER 12 OF 25 HCA COPYRIGHT 2003 ACS on STN

132:169819 Deposition of **zinc oxide** thin films by
combustion CVD. Polley, T. A.; Carter, W. B.; Poker, D. B. (School
of Materials Science and Engineering, Georgia Institute of
Technology, Atlanta, GA, USA). Thin Solid Films, 357(2), 132-136
(English) 1999. CODEN: THSFAP. ISSN: 0040-6090. Publisher:
Elsevier Science S.A..

AB Combustion chem. vapor deposition (combustion CVD) has been
developed to produce **zinc oxide** thin films.
Combustion CVD is different from conventional CVD in that it is
performed in a flame. The flame provides the energy, primarily in
the form of heat, necessary to deposit ceramic thin films. Zinc

2-ethylhexanoate was dissolved in an org. solvent to produce the flammable solns. used to deposit **zinc oxide** films onto amorphous silica substrates. Zinc ion concns. in the solns. were 0.01 M. Substrate temps. were monitored and controlled during the depositions. Several substrate temps., ranging from 190-850.degree.C, were used. Cryst. films up to 1.4 .mu.m thick were produced at deposition rates up to 5 .mu.m/h.. The films were of the **hexagonal wurtzite** structure and displayed a strong preferred orientation of (002) normal to the substrate surfaces. A variety of microstructures were produced depending on substrate temp. during deposition. SEM, transmission electron microscopy, X-ray diffraction and Rutherford backscattering spectrometry were used to characterize the films.

IT 1314-13-2P, **Zinc oxide (ZnO)**,
preparation
(films; combustion CVD and properties of **zinc oxide** thin films)
RN 1314-13-2 HCA
CN Zinc oxide (ZnO) (9CI) (CA INDEX NAME)

O—Zn

CC 57-2 (Ceramics)
ST **zinc oxide** film combustion CVD property
IT Vapor deposition process
(chem., combustion; combustion CVD and properties of **zinc oxide** thin films)
IT Crystal orientation
(combustion CVD and properties of **zinc oxide** thin films)
IT Ceramic coatings
(**zinc oxide**; combustion CVD and properties of **zinc oxide** thin films)
IT 7631-86-9, Silica, uses
(amorphous, substrates; combustion CVD and properties of **zinc oxide** thin films)
IT 1314-13-2P, **Zinc oxide (ZnO)**,
preparation
(films; combustion CVD and properties of **zinc oxide** thin films)
IT 136-53-8, Hexanoic acid, 2-ethyl-, zinc salt
(precursor; combustion CVD and properties of **zinc oxide** thin films)

L48 ANSWER 13 OF 25 HCA COPYRIGHT 2003 ACS on STN
129:116179 Postdeposition reduction of noble metal doped **ZnO** films. Exarhos, Gregory J.; Rose, Aimee; Wang, Li Qiong; Windisch, Charles F., Jr. (POB 999, Pacific Northwest National Laboratory, MS K2-44, Richland, WA, 99352-1611, USA). Journal of Vacuum Science & Technology, A: Vacuum, Surfaces, and Films, 16(3, Pt. 2), 1926-1933 (English) 1998. CODEN: JVTAD6. ISSN: 0734-2101. Publisher:

American Institute of Physics.

AB Insulating **ZnO** (**wurtzite** phase) films contg. 1% to 2% **Pt**, **Au**, **Pd**, **Ga**, or **Al** dopants were deposited onto **SiO₂**, **Si**, and **Al** substrates under oxidizing conditions. Substantial enhancement in film cond. is promoted by post-deposition redn. in **H** above a crit. temp. or by room temp. cathodic redn. in an electrochem. cell. Film redn. requires the presence of at. **H**, formed at the film surface either by dissociative adsorption of gaseous **H₂** or its electrochem. generation from a buffered aq. soln. As deposited and reduced films were characterized using x-ray photoemission spectroscopy, Raman spectroscopy, optical transmission measurements, spectroscopic ellipsometry, voltammetry, chronopotentiometry, and four-point cond. measurements. Film deposition parameters and post-deposition redn. alter the oxidn. states of both the **Zn** and the resident dopant cations. The **Zn** redn. reaction appears to be quasireversible while the reduced noble metal dopants in the films are not prone to reoxidn. These results may have implications for enhancing stability of the optical response and elec. cond. exhibited by these films.

IT 1314-13-2, **Zinc oxide**, properties
(increased cond. from redn. of metal-doped **zinc oxide** films)

RN 1314-13-2 HCA

CN Zinc oxide (**ZnO**) (9CI) (CA INDEX NAME)

O=Zn

CC 76-2 (Electric Phenomena)

Section cross-reference(s): 57, 67, 72, 73

ST film doped **zinc oxide** cond redn; cathodic redn
doped **zinc oxide** cond; **hydrogen** redn
doped zinc oxide cond; cond redn metal
doped **zinc oxide**

IT Transparent films
(elec. conductive; increased cond. from redn. of metal-doped **zinc oxide** films)

IT Electric conductors
(films, transparent; increased cond. from redn. of metal-doped **zinc oxide** films)

IT Electric conductivity
Reduction
Reduction, electrochemical
(increased cond. from redn. of metal-doped **zinc oxide** films)

IT Platinum-group metals
(increased cond. from redn. of metal-doped **zinc oxide** films)

IT Valence
(increased cond. from redn. of metal-doped **zinc oxide** films in relation to)

IT 7429-90-5, Aluminum, properties 7440-05-3, Palladium, properties

- 7440-06-4, Platinum, properties 7440-55-3, Gallium, properties
7440-57-5, Gold, properties
(increased cond. from redn. of metal-doped **zinc oxide** films)
- IT 12385-13-6P, Atomic hydrogen, preparation
(increased cond. from redn. of metal-doped **zinc oxide** films)
- IT 1314-13-2, **Zinc oxide**, properties
(increased cond. from redn. of metal-doped **zinc oxide** films)
- IT 1333-74-0, Hydrogen, reactions
(increased cond. from redn. of metal-doped **zinc oxide** films)
- IT 7440-66-6, Zinc, properties
(increased cond. from redn. of metal-doped **zinc oxide** films in relation to valence change of)
- L48 ANSWER 14 OF 25 HCA COPYRIGHT 2003 ACS on STN
126:35558 Preparation of transparent and conductive **ZnO** thin films by applying a solution of zinc alkoxide. Isago, Takashi; Sonobe, Sunao; Ohkawa, Toshikazu; Sunayama, Hideki (Department Industrial Chemistry, Ibaraki National College Technology, Hitachinaka, 312, Japan). Journal of the Ceramic Society of Japan, 104(Nov.), 1052-1055 (Japanese) 1996. CODEN: JCSJEW. Publisher: Ceramic Society of Japan.
- AB Transparent thin films of **ZnO** and Al-doped **ZnO** have been prepd. on a glass substrate by a spin-coating method using a soln. of zinc di-n-butoxide-2,2'-iminodiethanol-ethanol. Heating temp. of 500.degree.C was adopted to convert a precursor of **ZnO** into **ZnO** (hexagonal wurtzite structure) polycryst. films. The films had a high transparency in the visible region and resistivities of .apprx.10¹ and .apprx.10⁰ .OMEGA..cntdot.cm for undoped and Al-doped **ZnO** films, resp. Annealing in **hydrogen** atm. reduced the resistivity of the films to .apprx.10⁻² and .apprx.-3 .OMEGA..cntdot.cm for undoped and Al-doped **ZnO** films, resp., without affecting the optical transmission.
- IT 1314-13-2, **Zinc oxide (ZnO)**,
processes
(films; prepn. of transparent and conductive **ZnO** thin films by applying a soln. of zinc butoxide)
- RN 1314-13-2 HCA
CN Zinc oxide (ZnO) (9CI) (CA INDEX NAME)

O=Zn

- CC 57-2 (Ceramics)
Section cross-reference(s): 76
- ST transparent conductive **zinc oxide** film prepn;
alkoxide derived **zinc oxide** film
- IT Films

- (elec. conductive; prepn. of transparent and conductive **ZnO** thin films by applying a soln. of zinc butoxide)
- IT Electric conductors
(films; prepn. of transparent and conductive **ZnO** thin films by applying a soln. of zinc butoxide)
- IT Transparent films
(prepn. of transparent and conductive **ZnO** thin films by applying a soln. of zinc butoxide)
- IT **1314-13-2, Zinc oxide (ZnO)**,
processes
(films; prepn. of transparent and conductive **ZnO** thin films by applying a soln. of zinc butoxide)
- L48 ANSWER 15 OF 25 HCA COPYRIGHT 2003 ACS on STN
121:143956 Morphology and fine structure of zinc electrodeposits. Yan, H.; Downes, J.; Boden, P. J.; Harris, S. J. (Dep. Maters. Eng. Maters. Design, Univ. Nottingham, Nottingham, NG7 2RD, UK). Philosophical Magazine A: Physics of Condensed Matter: Structure, Defects and Mechanical Properties, 70(2), 391-404 (English) 1994. CODEN: PMAADG. ISSN: 0141-8610.
- AB A 'nanolaminated' structure has been obsd. in electrodeposited Zn by using high-resoln. transmission electron microscopy. The individual Zn crystallites in the deposits are all bounded by an ultra-thin **zinc oxide (ZnO)** layer about 3.5 nm in thickness. The crystallites are predominantly **hexagonal** platelet shaped, typically 300 nm in diam. and 50 nm in thickness. The presence of grains with a specific **hexagonal** geometry in the deposit results from a layered texture, which is made by a repeated sandwich-like epitaxial growth between Zn (**hexagonal**) and **ZnO (wurtzite structure)**. Such a structural growth pattern is discussed in terms of the kinetics of the electrodeposition process. It is proposed that Zn deposition occurs from zinc hydroxide (**Zn(OH)2**) which forms close to the metal-electrolyte interface as a result of **H2** evolution and the local increase in electrolyte pH. The interaction between the depletion of the **Zn(OH)2** colloidal layer due to Zn deposition and its re-formation due to the **H2** evolution reaction could lead to cyclic changes near the cathode. This could control the formation of a layered texture in the Zn deposit, as **ZnO** which forms intermittently from the dehydration of **Zn(OH)2** at the electrode-colloid interface. The structural observations also explains why superior corrosion resistance is often shown by electrodeposited Zn, that is because of controlled distribution of the **ZnO** in the deposit.
- IT **1333-74-0P, Hydrogen**, preparation
(evolution of, in zinc electrodeposition, zinc hydroxide and **zinc oxide** formation in relation to)
- RN 1333-74-0 HCA
CN Hydrogen (8CI, 9CI) (CA INDEX NAME)

IT 1314-13-2, **Zinc oxide**, uses
(presence of, in zinc electrodeposits)
RN 1314-13-2 HCA
CN Zinc oxide (ZnO) (9CI) (CA INDEX NAME)

O—Zn

CC 72-8 (Electrochemistry)
Section cross-reference(s): 56, 75
ST zinc electrodeposit morphol fine structure; deposit **zinc oxide** interface zinc crystallite
IT Surface structure
(of zinc electrodeposits contg. **zinc oxide** particles)
IT Dehydration, chemical
(of zinc hydroxide, in zinc electrodeposition, **zinc oxide** presence in relation to)
IT Electrodeposition and Electroplating
(of **zinc oxide** contg. **zinc oxide** particles)
IT Crystallites
(zinc with **zinc oxide**, electrodeposition of)
IT Electrodeposits and Electroplates
(zinc, contg. **zinc oxide**, morphol. and fine structure of)
IT 20427-58-1, Zinc dihydroxide
(dehydration of, during zinc electrodeposition, **zinc oxide** from)
IT 7757-82-6, Disodium sulfate, uses
(electrodeposition of zinc contg. **zinc oxide** in electrolyte contg.,)
IT 12597-69-2, Steel, miscellaneous
(electrodeposition of zinc contg. **zinc oxide** on mild)
IT 7440-66-6, Zinc, uses
(electrodeposits, morphol. and fine structure and **zinc oxide** presence in)
IT 1333-74-0P, **Hydrogen**, preparation
(evolution of, in zinc electrodeposition, zinc hydroxide and **zinc oxide** formation in relation to)
IT 1314-13-2, **Zinc oxide**, uses
(presence of, in zinc electrodeposits)

L48 ANSWER 16 OF 25 HCA COPYRIGHT 2003 ACS on STN
121:97353 Real time spectroellipsometry study of the interaction of hydrogen with **ZnO** during **ZnO/a-Si1-xCxH** interface formation. An, Ilsin; Lu, Yiwei; Wronski, C. R.; Collins, R. W. (Mater. Res. Lab., Pennsylvania State Univ., University Park, PA, 16802, USA). Applied Physics Letters, 64(24), 3317-19 (English) 1994. CODEN: APPLAB. ISSN: 0003-6951.

- AB By using real time spectroellipsometry (SE), the authors have studied the interfacial interactions that occur when i- and p-type hydrogenated amorphous silicon carbon alloys (a-Si_{1-x}C_x:H) are deposited from hydride-contg. plasmas onto transparent, conducting films of **ZnO**. The SE spectra collected during the nucleation of a-Si_{1-x}C_x:H onto **ZnO** reveal a widening of the near-interface optical gap of **ZnO** by .apprx.0.1 eV, an effect attributed to the penetration of at. H from the plasma. The SE data along with ex-situ SIMS, reveal that the H diffuses into **ZnO** to depths >200 .ANG.. The defects that result from **H incorporation** in **ZnO** (e.g., O **vacancies**) lead to a shift in the near-interface Fermi level higher into the **ZnO** conduction band and to an estd. enhancement in the electron concn. by .apprx.10²⁰ cm⁻³.
- IT 1314-13-2, **Zinc monoxide**, properties
(interaction of hydrogen with, in interface formation with hydrogenated amorphous silicon carbide)
- RN 1314-13-2 HCA
- CN Zinc oxide (ZnO) (9CI) (CA INDEX NAME)

O—Zn

- CC 76-5 (Electric Phenomena)
Section cross-reference(s): 52
- ST hydrogen **zinc oxide** silicon carbide interface;
spectroellipsometry **zinc oxide** silicon carbide interface
- IT 409-21-2, Silicon carbide, properties
(interaction of hydrogen with **zinc oxide** in interface formation with hydrogenated amorphous, spectroellipsometric study of)
- IT 1314-13-2, **Zinc monoxide**, properties
(interaction of hydrogen with, in interface formation with hydrogenated amorphous silicon carbide)
- IT 1333-74-0, Hydrogen, properties
(interaction of, with **zinc oxide** in interface formation with hydrogenated amorphous silicon carbide)
- L48 ANSWER 17 OF 25 HCA COPYRIGHT 2003 ACS on STN
119:212831 Spectroscopic determination of the flatband potential of transparent nanocrystalline **zinc oxide** films.
Redmond, Gareth; O'Keeffe, Angela; Burgess, Carol; MacHale, Ciara; Fitzmaurice, Donald (Dep. Chem., Univ. Coll. Dublin, Dublin, Ire.).
Journal of Physical Chemistry, 97(42), 11081-6 (English) 1993.
CODEN: JPCHAX. ISSN: 0022-3654.
- AB Ethanolic **ZnO** dispersions were characterized by optical absorption spectroscopy, TEM, and x-ray diffraction spectroscopy. Freshly prepd. dispersions contain spherical crystallites (**hexagonal wurtzite**), having an av. diam. of 2 nm, and show confinement effects. Dispersions aged at room temp. for 5 days contain spherical crystallites, having an av. diam. of 13 nm,

and show no confinement effects. Transparent nanocryst. films (thickness 4 .mu.m) were formed on a conducting glass (SnO₂) substrate by sintering 13-nm crystallites in air at 450.degree. for 3 h. Incorporation in an electrochem. cell, as the working electrode, permits potentiostatic control of the Fermi level within these films. On applying a potential more neg. than the flatband potential, electrons accumulate in the **ZnO** conduction band. No absorbance which could be assigned to free conduction band electrons was obsd. at 300-800 nm. Charge carrier behavior was monitored by measuring the Burstein shift at wavelengths shorter than 385 nm. The potential at which a Burstein shift of a given magnitude was obsd. exhibits the expected Nernstian shift of 0.06 V per pH unit for a metal oxide semiconductor in an aq. electrolyte soln. Calcn. of the flatband potential was possible from the measured relation between the Burstein shift and applied potential at several different pHs.

IT 1314-13-2, **Zinc oxide**, properties
(flatband potential of transparent nanocryst. films of, Burstein shift in spectroscopic detn. of)
RN 1314-13-2 HCA
CN Zinc oxide (ZnO) (9CI) (CA INDEX NAME)

O= Zn

CC 72-2 (Electrochemistry)
Section cross-reference(s): 73, 76
ST **zinc oxide** nanocryst film flatband potential;
spectroscopic detn flatband potential **zinc oxide**
; Burstein shift flatband potential **zinc oxide**
IT Ultraviolet and visible spectra
(of **zinc oxide** transparent nanocryst. films,
flatband potential in relation to)
IT Electric potential
(flatband, of **zinc oxide** transparent
nanocryst. films, Burstein shift in spectroscopic detn. of)
IT 1314-13-2, **Zinc oxide**, properties
(flatband potential of transparent nanocryst. films of, Burstein shift in spectroscopic detn. of)

L48 ANSWER 18 OF 25 HCA COPYRIGHT 2003 ACS on STN
115:59864 Optical properties of aluminum-doped **zinc oxide** films prepared by reactive d.c. magnetron sputtering. Ghosh, S.; Sarkar, A.; Chaudhuri, S.; Pal, A. K. (Dep. Mater. Sci., Indian Assoc. Cultiv. Sci., Calcutta, 700032, India). Vacuum, 42(10-11), 645-8 (English) 1991. CODEN: VACUAV. ISSN: 0042-207X.
AB **ZnO:Al** films prepd. by d.c. magnetron sputtering were studied in the spectral range 300-1400 nm. The effect of post deposition heat treatments in air and in a hydrogen atm. on the optical properties were critically evaluated. The variation of refractive indexes and extinction coeffs., along with the band gap due to the above, were correlated with the microstructures of the

films. The presence of trap states at the grain boundaries and the no. of charge carriers due to oxygen **vacancies** arising from absorption or desorption of oxygen seems to control the optical properties of these films.

IT 1314-13-2, **Zinc oxide**, properties
(optical properties of d.c. magnetron-sputtered aluminum-doped film of, cond. and Hall effect in relation to)
RN 1314-13-2 HCA
CN Zinc oxide (ZnO) (9CI) (CA INDEX NAME)

O=Zn

CC 73-4 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 76
ST **zinc oxide** film aluminum optical elec; UV spectra **zinc oxide** film aluminum; band gap **zinc oxide** film aluminum; Hall effect **zinc oxide** film aluminum; argon plasma **zinc oxide** film aluminum; hydrogen annealing **zinc oxide** film aluminum
IT Hall effect
Ultraviolet and visible spectra
(of **zinc oxide** films contg. aluminum)
IT Energy level, band structure
(gap, of **zinc oxide** films contg. aluminum)
IT 7782-44-7, Oxygen, properties
(adsorption of, on **zinc oxide** d.c. magnetron-sputtered film contg. aluminum, optical and elec. properties in relation to)
IT 1333-74-0, **Hydrogen**, properties
(aluminum-doped **zinc oxide** film annealed in atm. contg., of d.c. magnetron-sputtered, optical and elec. properties of)
IT 7440-37-1, Argon, properties
(d.c. magnetron-sputtering of aluminum-doped **zinc oxide** film in atm. contg., optical and elec. properties of)
IT 1314-13-2, **Zinc oxide**, properties
(optical properties of d.c. magnetron-sputtered aluminum-doped film of, cond. and Hall effect in relation to)
IT 7429-90-5, Aluminum, properties
(**zinc oxide** film contg., optical and elec. properties of d.c. magnetron-sputtered)

L48 ANSWER 19 OF 25 HCA COPYRIGHT 2003 ACS on STN

108:15339 Thick film **zinc oxide** resistive gas sensors: Analysis of their kinetic behavior. Pizzini, S.; Palladino, M.; Butta, N.; Mari, C. M. (Dep. Phys. Chem. Electrochem., Univ. Milan, Milan, 20133, Italy). Proceedings - Electrochemical Society, 87-9(Proc. Symp. Chem. Sens.), 99-109

(English) 1987. CODEN: PESODO. ISSN: 0161-6374.

AB The time and temp. dependence of the elec. cond. of H-sensitive **ZnO** gas sensors were studied. Al-doped **ZnO** films were prepd. by wet spray pyrolysis on ceramic substrates. After conditioning at 1173 K, the **ZnO** surface was activated with **Pt**. The H assisted reaction of desorption of surface chemisorbed O occurred parallel with a direct redn. of **ZnO**. A good fit of the H pressure and time dependence of the elec. cond. with theor. predictions was obtained when attention was given to the parasitic reaction of O.

IT **1314-13-2, Zinc oxide (ZnO)**,
uses and miscellaneous
(hydrogen sensor, effects of oxygen chemisorption on)
RN 1314-13-2 HCA
CN Zinc oxide (ZnO) (9CI) (CA INDEX NAME)

O=Zn

CC 79-2 (Inorganic Analytical Chemistry)
Section cross-reference(s): 59, 76
ST **zinc oxide** hydrogen sensor elec cond
IT Air analysis
(hydrogen detn. in, by **zinc oxide** sensor,
oxygen chemisorption and desorption in relation to)
IT Electric conductivity and conduction
(of hydrogen-sensitive **zinc oxide** sensor,
oxygen chemisorption and desorption in relation to)
IT Desorption
(of oxygen, from hydrogen-sensitive **zinc oxide**
sensor, elec. cond. in relation to)
IT Chemisorption
(of oxygen, on hydrogen-sensitive **zinc oxide**
sensor, elec. cond. in relation to)
IT Reduction
(of **zinc oxide**, by hydrogen assisted
desorption of chemisorbed oxygen in sensor)
IT 7782-44-7, Oxygen, properties
(chemisorption and desorption of, on **zinc oxide**
hydrogen sensor, elec. cond. in relation to)
IT 1333-74-0, Hydrogen, analysis
(detn. of, in air with **zinc oxide** sensor,
oxygen chemisorption in relation to)
IT **1314-13-2, Zinc oxide (ZnO)**,
uses and miscellaneous
(hydrogen sensor, effects of oxygen chemisorption on)
IT 7429-90-5, Aluminum, uses and miscellaneous 7440-06-4, Platinum,
uses and miscellaneous
(**zinc oxide** hydrogen sensor
doped with, effect of oxygen chemisorption on)

L48 ANSWER 20 OF 25 HCA COPYRIGHT 2003 ACS on STN

- 106:129894 Acceptors and donors in the wide-gap semiconductors **zinc oxide** and tin dioxide. Wolf, H.; Deubler, S.; Forkel, D.; Foettinger, H.; Iwatschenko-Borho, M.; Meyer, F.; Renn, M.; Witthuhn, W.; Helbig, R. (Phys. Inst., Univ. Erlangen-Nuernberg, Erlangen, D-8520, Fed. Rep. Ger.). Materials Science Forum, 10-12(Proc. Int. Conf. Defects Semicond., 14th, 1986, Pt. 3), 863-8 (English) 1986. CODEN: MSFOEP. ISSN: 0255-5476.
- AB The local electronic properties of acceptors and donor impurities in **ZnO** and **SnO2** were investigated by the perturbed angular correlation method. In both semiconductors the ¹¹¹In probe atoms are located at substitutional cation sites. In undoped **ZnO** single crystals, the trapping of an O **vacancy** was obsd. In Na- and Li-doped **ZnO** single crystals, the interaction between In donors and alkali acceptors was studied. The PAC data of pure and **H-doped** **SnO2** indicate electronic perturbations due to the excitations of the at. shell after the radioactive decay.
- IT **1314-13-2, Zinc oxide**, properties
(electron acceptors and donors in)
- RN 1314-13-2 HCA
- CN Zinc oxide (ZnO) (9CI) (CA INDEX NAME)

O—Zn

- CC 76-1 (Electric Phenomena)
- IT Electron acceptors
Electron donors
(in **zinc oxide** and tin oxide wide-gap semiconductors)
- IT Gamma ray, chemical and physical effects
(perturbed angular correlation of, in **zinc oxide** and tin oxide, in electron acceptor and donor study)
- IT **1314-13-2, Zinc oxide**, properties
18282-10-5, Tin oxide (**SnO2**)
(electron acceptors and donors in)
- L48 ANSWER 21 OF 25 HCA COPYRIGHT 2003 ACS on STN
- 106:83817 Gaseous promoter effects in methanol synthesis on **zinc oxide**. Bowker, M.; Hyland, J. N. K.; Vandervell, H. D.; Waugh, K. C. (Imp. Chem. Ind. PLC, Runcorn, UK). Int. Congr. Catal., [Proc.], 8th, Meeting Date 1984, Volume 2, II35-II46. Verlag Chemie: Weinheim, Fed. Rep. Ger. (English) 1985. CODEN: 55DBAG.
- AB MeOH was shown to be formed by the interaction of CO₂ and H at 523-573K over polycryst. **ZnO** pre-reduced in H. It is not formed by the interaction of CO and H which produces only CO₂ and a more highly defective **ZnO**. However, when CO₂/H is reacted with this highly defective **ZnO**, the rate of MeOH synthesis is increased initially tenfold, falling with time to the same steady state value obtained by H pre-redn. Furthermore, the total amt. of

MeOH produced by the CO₂/H reaction with the highly defective **ZnO**, in excess of that produced by H pre-redn., is roughly equal to the no. of excess anion **vacancies** produced by CO/H pre-treatment. These **vacancies** appear therefore (i) to be localized at the surface and (ii) to be specific for CO₂ chemisorption and its selective transformation to MeOH. They cannot be re-introduced by H redn. CO₂, therefore, is the mol. immediately responsible for MeOH synthesis on **ZnO** while CO, being a stronger reducing agent than H, produces the defect sites for the specific transformation of CO₂ to MeOH.

IT 1314-13-2, **Zinc oxide**, uses and
miscellaneous
(catalyst, for carbon dioxide hydrogenation)
RN 1314-13-2 HCA
CN Zinc oxide (ZnO) (9CI) (CA INDEX NAME)

O=Zn

CC 22-7 (Physical Organic Chemistry)
Section cross-reference(s): 45, 67
ST methanol synthesis carbon dioxide hydrogenation; **zinc oxide** catalyst methanol synthesis
IT Hydrogenation catalysts
(**zinc oxide**, for carbon dioxide to methanol)
IT 1314-13-2, **Zinc oxide**, uses and
miscellaneous
(catalyst, for carbon dioxide hydrogenation)
IT 124-38-9, Carbon dioxide, reactions
(hydrogenation of, on **zinc oxide** catalyst)
IT 67-56-1P, preparation
(prepn. of, by hydrogenation of carbon dioxide over **zinc oxide** catalyst)

L48 ANSWER 22 OF 25 HCA COPYRIGHT 2003 ACS on STN

105:211679 Studies on semiconducting thin films prepared by the spray pyrolysis technique for photoelectrochemical solar cell applications: preparation and properties of **zinc oxide**. Bahadur, L.; Hamdani, M.; Koenig, J. F.; Chartier, P. (Lab. Electrochim. Chim.-Phys. Corps. Sol, Univ. Louis Pasteur, Strasbourg, 67000, Fr.). Solar Energy Materials, 14(2), 107-20 (English) 1986. CODEN: SOEMDH. ISSN: 0165-1633.

AB Thin films of **ZnO** on glass substrate were prepd. by the spray pyrolysis method using aq. solns. of Zn(NO₃)₂. The conditions of the prepn. were optimized to get good-quality films with the required properties. The films were characterized for their structural, optical, and elec. properties. X-ray diffraction anal. showed that the deposited material was pure **ZnO** with a **hexagonal wurtzite**-type structure. Optical absorption spectra show a high transparency for the film (90-95% transmission) in the visible range, with a sharp absorption edge at .apprx.380 nm which closely corresponds to the intrinsic band gap of

ZnO (3.2 eV). The cond. of the deposited film could be increased by .apprx.5 orders of magnitude by annealing it in **H** at 400.degree.. In this way, a film with a of cond. of .apprx.10/.OMEGA.-cm could be obtained. The adherence of the film on glass substrates was quite good.

IT 1314-13-2P, preparation
 (manuf. of, by spray pyrolysis of aq. zinc nitrate, for photoelectrochem. applications)
 RN 1314-13-2 HCA
 CN Zinc oxide (ZnO) (9CI) (CA INDEX NAME)

O—Zn

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 ST **zinc oxide** photoelectrochem electrode
 IT Optical absorption
 (of **zinc oxide** films on quartz, substrate temp. during deposition in relation to)
 IT Electric conductivity and conduction
 (of **zinc oxide** films, temp. of annealing in **hydrogen** in relation to)
 IT Electrodes
 (photoelectrochem., **zinc oxide** for, manuf. and properties of)
 IT 1314-13-2P, preparation
 (manuf. of, by spray pyrolysis of aq. zinc nitrate, for photoelectrochem. applications)

L48 ANSWER 23 OF 25 HCA COPYRIGHT 2003 ACS on STN

94:149537 Metal-semiconductor junctions for the detection of reducing gases and the mechanism of the electrical responses. Tonomura, Shoichiro; Matsuoka, Tsugufumi; Yamamoto, Naoto; Tsubomura, Hiroshi (Fac. Eng., Osaka Univ., Toyonaka, 560, Japan). Nippon Kagaku Kaishi (10), 1585-90 (Japanese) 1980. CODEN: NKAKB8. ISSN: 0369-4577.

AB The current-potential (I-U) curves for a Pd-TiO₂ diode, prepd. by the vacuum evapn. of Pd on TiO₂, are sensitive to H in the ambient. The diode is capable of monitoring H quant. from .apprx.0.1 ppm to 2% in the air. Both the I-U measurements and the work function measurements confirm that the **introduced H** decreases the work function of Pd metal and consequently reduces the Schottky barrier height at the Pd and TiO₂ interface. The decrease in the work function of Pd is brought about by the reaction of H with the preadsorbed O on the surface of Pd, resulting in its removal from the surface as water. Below 60.degree., the diode has no sensitivity for other reducing gases such as hydrocarbons, but becomes sensitive to CO, EtOH, and C₃H₆ at higher temps. The **Pt**-TiO₂ and AuTiO₂ diodes show I-U behavior similar to that of the Pd-TiO₂ diode. The sensitivity to H decreases in the order: Pd>**Pt**>Au. The Pd-**ZnO** (single crystal or sinter) diode is also sensitive to hydrogen.

IT 1314-13-2, uses and miscellaneous
(semiconductor diodes with noble metals, for detection of
reducing gases, mechanism of elec. response at junction of metal
with)
RN 1314-13-2 HCA
CN Zinc oxide (ZnO) (9CI) (CA INDEX NAME)

O—Zn

CC 79-2 (Inorganic Analytical Chemistry)
Section cross-reference(s): 76
ST metal semiconductor junction gas detector; reducing gas
semiconductor junction detector; hydrogen detection palladium
titania diode; platinum titania diode hydrogen detection; gold
titania diode hydrogen detection; **zinc oxide**
diode hydrogen detection
IT Diodes
(noble metal-titania or **zinc oxide**, for
detection of reducing gases, mechanism of elec. responses of)
IT 1314-13-2, uses and miscellaneous 13463-67-7, uses and
miscellaneous
(semiconductor diodes with noble metals, for detection of
reducing gases, mechanism of elec. response at junction of metal
with)

L48 ANSWER 24 OF 25 HCA COPYRIGHT 2003 ACS on STN
67:53402 Elementary stages of heterogeneous catalytic dehydration of
alcohols. Myasnikov, I. A.; Bol'shun, E. V. Metody Issledovaniya
Katalizatorov i Kataliticheskikh Reaktsii, 1, 41-51 (Russian) 1965.
CODEN: MIKKAW. ISSN: 0369-0253.
AB cf. CA 56: 2079d. Increase in the pressure of iso-PrOH over
ZnO/quartz at 300-90.degree. above a definite limit led to
the disappearance of the pos. elec. cond. signal in the film and
even to the appearance of the neg. signal. The effects are
explained by the assumption that the process by which the H atoms
formed affect pos. the elec. cond. of the film is slower than their
recombination or reactions with adsorbed species (the alc. radicals
may act as an electron trap). The problem of the emission of H
atoms from the catalyst surface was solved by the
semiconductor-probe technique. The app. consisted of 2 flasks
communicating through a tube. One of the flasks (A) contained a
cylindrical quartz tube coated inside with **ZnO** and hinged
on 2 **Pt** wires, and the other a **ZnO** coated quartz
frame, also hinged on 2 **Pt** wires. Introduction of a
definite amt. of iso-PrOH into the flask A kept at 350-90.degree. of
the evacuated app. resulted in an increase of the elec. cond. of the
ZnO film on the cylinder and also in a lower, but rapid
increase in the cond. of the **ZnO** film on the frame kept at
150-80.degree.. **Introduction** of mol. **H** raised
slightly the cond. of the cylinder coating, but did not change
substantially the cond. of the probe. Ne and He did not affect the

conductivities of the ZnO coatings in any conditions. When a noncoated cylinder was used instead of the coated one, no increase in the cond. of the probe followed the introduction of iso-PrOH in any conditions. Ne present in the app. blocked the increase in the cond. of the probe on the introduction of iso-PrOH (evidently due to the space recombination of the H atoms emitted from the cylinder coating), and Pd placed in the connecting tube had the same effect (due to the surface recombination of at. H). All the results confirm the presumption that the increases in the cond. of the probe observed are due to the H atoms emitted from the cylinder coating. The concns. of the H atoms in the vicinity of the probe and of the cylinder were 108 and 109 atoms/cm.3, resp. (on the surface of the cylinder coating the concn. was 1011-1012 atoms/cm.2). The mechanism of the evolution of at. H is interpreted in terms of the direct splitting of iso-PrOH on the catalyst surface.

IT 1314-13-2, uses and miscellaneous
(catalysts from silica and, for dehydrogenation of isopropyl alc.)
RN 1314-13-2 HCA
CN Zinc oxide (ZnO) (9CI) (CA INDEX NAME)

O=Zn

CC 22 (Physical Organic Chemistry)
IT Dehydration, chemical
(of isopropyl alc. on zinc oxide-quartz catalysts, mechanism of)
IT 1314-13-2, uses and miscellaneous
(catalysts from silica and, for dehydrogenation of isopropyl alc.)
IT 67-63-0, reactions
(dehydration of, on zinc oxide-quartz catalysts, mechanism of)

L48 ANSWER 25 OF 25 HCA COPYRIGHT 2003 ACS on STN
57:53782 Original Reference No. 57:10679c-d Paramagnetic resonance of Mn++ ions in synthetic and natural ZnO crystals. Schneider, J.; Sircar, S. R. (Inst. Elektrowerkstoffe, Freiburg i. Br., Germany). Zeitschrift fuer Naturforschung (17a), 570-7 (Unavailable) 1962. CODEN: ZNTFA2. ISSN: 0372-9516.
AB The paramagnetic resonance of Mn++ ions in hexagonal synthetic and natural ZnO crystals was analyzed at x-band frequencies. The following parameters of the spin-Hamiltonian resulted from the spectrum H.dblvert.c at 300.degree.K: g.dblvert. = 2.0012 .+-. 0.0002, |D| = 0.02362 .+-. 0.00004 cm.-1, |A| 0.007410 .+-. 0.000005 cm.-1, |a-F| = 0.000523 .+-. 0.000005 cm.-1 with sign D = sign A= -sign (a-F). The parameter of the cubic field splitting, |a| = 0.000620 .+-. 0.000005 cm.-1, was detd. by using the splitting of some finestructure lines. The splitting is due to 2 different lattice sites in the wurtzite

structure. An anomalous increase in line width was observed at 77.degree.K. in synthetic **ZnO**.

IT 1314-13-2, **Zinc oxide**
(manganese in crystals of, magnetic resonance absorption of)
RN 1314-13-2 HCA
CN Zinc oxide (ZnO) (9CI) (CA INDEX NAME)

O=Zn

CC 10 (Spectra and Some Other Optical Properties)
IT Magnetic resonance absorption
(of manganese in **ZnO**)
IT 7439-96-5, Manganese
(magnetic resonance absorption of, in **ZnO**)
IT 1314-13-2, **Zinc oxide**
(manganese in crystals of, magnetic resonance absorption of)

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L49 ANSWER 1 OF 14 HCA COPYRIGHT 2003 ACS on STN
138:240524 XPS, TEM and NRA investigations of Zn(Se,OH)/Zn(OH)₂ films on Cu(In,Ga)(S,Se)₂ substrates for highly efficient solar cells. Eisele, W.; Ennaoui, A.; Schubert-Bischoff, P.; Giersig, M.; Pettenkofer, C.; Krauser, J.; Lux-Steiner, M.; Zweigart, S.; Karg, F. (Hahn-Meitner Institut, Berlin, D-14109, Germany). Solar Energy Materials and Solar Cells, 75(1-2), 17-26 (English) 2003. CODEN: SEMCEQ. ISSN: 0927-0248. Publisher: Elsevier Science B.V..
AB Structural and compositional properties of Zn(Se,OH)/Zn(OH)₂ buffer layers deposited by chem. bath deposition on Cu(In,Ga)(S,Se)₂ (CIGSS) absorbers are investigated. Due to the aq. nature of the chem. bath deposition process, oxygen and **hydrogen** were **incorporated** into the ZnSe buffer layer mainly in the form of Zn(OH)₂ as is shown by XPS and nuclear reaction anal. (NRA) measurements leading to the nomenclature Zn(Se,OH). Prior to the deposition of Zn(Se,OH), a zinc treatment of the absorber was performed. During that treatment a layer mainly consisting of Zn(OH)₂ grew to a thickness of several nanometers. The whole buffer layer therefore consists of a Zn(Se,OH)/Zn(OH)₂ structure on CIGSS. Part of the Zn(OH)₂ in both layers (i.e., the Zn(Se,OH) and the Zn(OH)₂ layer) might be converted into **ZnO** during measurements or storage. SEM pictures showed that a complete coverage of the absorber with the buffer layer was achieved. Transmission electron microscopy revealed the different regions of the buffer layer: an amorphous area [possibly Zn(OH)₂] and a partly nanocryst. area, where **lattice** planes of ZnSe could be identified. Solar cell efficiencies of **ZnO**/Zn(Se,OH)/Zn(OH)₂/CIGSS devices exceed 14% (total area).
IT 1314-13-2, **Zinc oxide**, formation
(nonpreparative)
(XPS, TEM and nuclear reaction anal. investigations of

Zn(Se,OH)/Zn(OH)₂ buffer layers on Cu(In,Ga)(S,Se)₂ substrates
for highly efficient solar cells)

RN 1314-13-2 HCA

CN Zinc oxide (ZnO) (9CI) (CA INDEX NAME)

O—Zn

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

IT 1314-13-2, **Zinc oxide**, formation

(nonpreparative)

(XPS, TEM and nuclear reaction anal. investigations of
Zn(Se,OH)/Zn(OH)₂ buffer layers on Cu(In,Ga)(S,Se)₂ substrates
for highly efficient solar cells)

L49 ANSWER 2 OF 14 HCA COPYRIGHT 2003 ACS on STN

138:196785 Reliability improvement of PMZNT relaxor ferroelectrics
through surface modification by MnO₂ doping against
electroplating-induced degradation. Cao, Jiang Li; Li, Long Tu;
Gui, Zhi Lun (Department of Materials Science and Engineering, State
Key Laboratory of New Ceramic and Fine Processing, Tsinghua
University, Beijing, 100084, Peop. Rep. China). Materials Chemistry
and Physics, 78(2), 546-550 (English) 2003. CODEN: MCHPDR. ISSN:
0254-0584. Publisher: Elsevier Science B.V..

AB Electroplating treatment, SEM observation, XPS, and x-ray
diffraction analyses were conducted to investigate the reliability
improvement of lead magnesium niobate-based ceramics (PMZNT) through
MnO₂ vaporous **doping** against **hydrogen** redn.
during electroplating. The results showed that the manganese dopant
was reduced to the +3 oxidn. state during the sintering and Mn³⁺ was
incorporated into the perovskite **lattice**; however, only
the outermost ceramics surface was doped while 50 .mu.m beneath
remained unchanged. This technique proved to enhance the
reliability of PMZNT against electroplating significantly without
changing the dielec. properties of the ceramic body. Based on the
above results, the modification mechanism of MnO₂ vaporous doping
was analyzed from the viewpoint of defect chem.

CC 76-8 (Electric Phenomena)

IT 12057-57-7, Lead magnesium niobium oxide (PbMg_{0.33}Nb_{0.67}O₃)

12060-00-3, Lead titanate 12300-05-9, Lead niobium **zinc**
oxide (PbNb_{0.67}Zn_{0.33}O₃)

(reliability improvement of PMZNT relaxor ferroelecs. through
surface modification by MnO₂ doping against electroplating
induced degrdn.)

L49 ANSWER 3 OF 14 HCA COPYRIGHT 2003 ACS on STN

136:376497 Nitrogen-related local vibrational modes in **ZnO:N**.

Kaschner, A.; Haboeck, U.; Strassburg, Martin; Strassburg, Matthias;
Kaczmarczyk, G.; Hoffmann, A.; Thomsen, C.; Zeuner, A.; Alves, H.
R.; Hofmann, D. M.; Meyer, B. K. (Institut fur Festkorperphysik,
Technische Universitat Berlin, Berlin, 10623, Germany). Applied
Physics Letters, 80(11), 1909-1911 (English) 2002. CODEN: APPLAB.

ISSN: 0003-6951. Publisher: American Institute of Physics.

- AB The authors study the influence of N, a potential acceptor in **ZnO**, on the **lattice** dynamics of **ZnO**. Samples grown by CVD contg. different N concns., as detd. by secondary ion mass spectroscopy (SIMS), were studied. The Raman spectra revealed vibrational modes at 275, 510, 582, 643, and 856 cm-1 in addn. to the host phonons of **ZnO**. The intensity of these addnl. modes correlates linearly with the N concn. and can be used as a quant. measure of N in **ZnO**. These modes are interpreted as local vibrational modes. Also, SIMS showed a correlation between the concn. of incorporated N and unintentional H, similar to the incorporation of the p-dopant Mg and H in GaN during metalorg. CVD.
- IT **1314-13-2, Zinc oxide (ZnO)**,
properties
(nitrogen-related local vibrational modes in **ZnO:N**)
- RN 1314-13-2 HCA
- CN Zinc oxide (ZnO) (9CI) (CA INDEX NAME)

O=Zn

- CC 73-3 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
- ST nitrogen doped **zinc oxide** Raman
- IT Vapor deposition process
(chem.; nitrogen-related local vibrational modes in **ZnO:N**)
- IT Vapor deposition process
(metalorg.; nitrogen-related local vibrational modes in **ZnO:N**)
- IT **Lattice** dynamics
Phonon
Secondary-ion mass spectrometry
(nitrogen-related local vibrational modes in **ZnO:N**)
- IT 7439-95-4, Magnesium, uses 12385-13-6, Hydrogen atom, uses 17778-88-0, Nitrogen atom, uses
(nitrogen-related local vibrational modes in **ZnO:N**)
- IT **1314-13-2, Zinc oxide (ZnO)**,
properties 25617-97-4, Gallium nitride (GaN)
(nitrogen-related local vibrational modes in **ZnO:N**)
- L49 ANSWER 4 OF 14 HCA COPYRIGHT 2003 ACS on STN
- 133:275082 Transparent and conductive **zinc oxide** film with low growth temperature. Cheung, Jeffrey T. (Rockwell Science Center, Llc, USA). Eur. Pat. Appl. EP 1041644 A2 20001004, 17 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO. (English). CODEN: EPXXDW. APPLICATION: EP 2000-101090 20000120. PRIORITY: US 1999-281198 19990330.
- AB The present invention relates to a novel **zinc oxide** thin film having hydrogen (H) and gallium (Ga)

dopants. Advantageously, the activation temp. is low. The co-doped **zinc oxide** is highly conductive, transparent, chem. stable, easily deposited on a variety of substrates, including flexible or plastic substrates, and is well suited for elec. or optical applications. By co-doping with two impurities, both sides of the **zinc oxide lattice** contribute to the film cond. resulting in high electron concn. and high mobility. The co-doped **zinc oxide** thin film has an increased Fermi level and a reduced work function that is <3eV. The co-doped **zinc oxide** is crystal clear and transparent even when grown at relatively low processing temps. In another preferred embodiment of the present invention, a novel low-temp. activation indium tin oxide (ITO) thin film comprising tin oxide co-doped with indium (In) and hydrogen is disclosed.

IT 1314-13-2P, **Zinc oxide**, properties
 (transparent and conductive **zinc oxide** film
 doped with **hydrogen** and gallium with low growth
 temp.)
 RN 1314-13-2 HCA
 CN Zinc oxide (ZnO) (9CI) (CA INDEX NAME)

O—Zn

IC ICM H01L031-0224
 ICS H01L031-18; H01L033-00
 CC 76-2 (Electric Phenomena)
 ST gallium **hydrogen doped zinc**
oxide transparent conductor film
 IT Films
 (elec. conductive, transparent; transparent and conductive
zinc oxide film doped with
hydrogen and gallium with low growth temp.)
 IT Transparent films
 (elec. conductive; transparent and conductive **zinc**
oxide film doped with **hydrogen** and
 gallium with low growth temp.)
 IT Electric conductors
 Electric conductors
 (films, transparent; transparent and conductive **zinc**
oxide film doped with **hydrogen** and
 gallium with low growth temp.)
 IT 1314-13-2P, **Zinc oxide**, properties
 50926-11-9P, Indium tin oxide
 (transparent and conductive **zinc oxide** film
 doped with **hydrogen** and gallium with low growth
 temp.)
 IT 1333-74-0, Hydrogen, uses 7440-55-3, Gallium, uses 7440-74-6,
 Indium, uses
 (transparent and conductive **zinc oxide** film
 doped with **hydrogen** and gallium with low growth
 temp.)

L49 ANSWER 5 OF 14 HCA COPYRIGHT 2003 ACS on STN

130:183900 Article having a high-temperature thermal control coating.
Long, Lynn E. (Hughes Electronics Corporation, USA). U.S. US
5876856 A 19990302, 7 pp., Cont.-in-part of U.S. Ser. No. 717,443.
(English). CODEN: USXXAM. APPLICATION: US 1997-994342 19971219.
PRIORITY: US 1994-242201 19940513; US 1996-717443 19960920.

AB An article such as a spacecraft thermal radiator includes a
substrate having a white thermal control coating thereon. The
thermal control coating is formed of a **matrix** of a
silica/silicate transformation product of a ceramic precursor, and a
plurality of doped **zinc oxide** pigment particles
distributed in the **matrix**. The **zinc
oxide** pigment particles are doped with an element that forms
shallow donor-like states in the **zinc oxide**.
The coating has a solar absorptance of from about 0.2 to about 0.3
and an initial elec. resistivity of from about 1.times.106 ohms per
square to about 1.times.108 ohms per square. The coating is stable
at continuous operating temps. of 225.degree., with short-term
exposures of up to 800.degree..

IT **1333-74-0, Hydrogen**, uses
(**dopant**; article having a high-temp. thermal control
coating)

RN 1333-74-0 HCA

CN Hydrogen (8CI, 9CI) (CA INDEX NAME)

H-H

IT **1314-13-2, Zinc oxide**, uses
(doped; article having a high-temp. thermal control coating)

RN 1314-13-2 HCA

CN Zinc oxide (ZnO) (9CI) (CA INDEX NAME)

O=Zn

IC ICM B05D005-06

ICS B05D005-12; B32B033-00; B32B018-00

NCL 428446000

CC 42-10 (Coatings, Inks, and Related Products)

Section cross-reference(s): 57

ST heat resistance coating spacecraft; silicone ceramic precursor
thermal coating; doped **zinc oxide** particle
thermal coating

IT **1333-74-0, Hydrogen**, uses 7429-90-5, Aluminum,
uses 7440-31-5, Tin, uses 7440-42-8, Boron, uses 7440-55-3,
Gallium, uses 7440-66-6, Zinc, uses 7440-74-6, Indium, uses
(**dopant**; article having a high-temp. thermal control
coating)

IT **1314-13-2, Zinc oxide**, uses
(doped; article having a high-temp. thermal control coating)

L49 ANSWER 6 OF 14 HCA COPYRIGHT 2003 ACS on STN

130:54775 Chemical changes of ITO/p and **ZnO**/p interfaces as a function of deposition parameters. Martinez, M. A.; Gutierrez, M. T.; Maffiotte, C. (Departamento de Energias Renovables, CIEMAT, Madrid, E-28040, Spain). Surface and Coatings Technology, 110(1-2), 68-72 (English) 1998. CODEN: SCTEEJ. ISSN: 0257-8972. Publisher: Elsevier Science S.A..

AB The influence of deposition parameters of p-type amorphous silicon on the chem. properties of different transparent conductive oxides (TCO)/p a-Si:H interfaces (ITO/p and **ZnO**/p) has been investigated by XPS. The p samples were prepd. by plasma-enhanced chem. vapor deposition (PECVD) from a SiH₄, B₂H₆ and He mixt., whereas TCO were made by rf-magnetron sputtering. In degree. has been detected on all ITO/p surfaces as a consequence of the redn. of this TCO by hydrogen resulting from silane decompn. during p-layer formation. Oxygen is released from the indium oxide cryst. **lattice**, which can react with the silicon to form silicon oxide, SiO_x, 1.ltoreq.x.ltoreq.2. No presence of ZnO has been obsd. on any **ZnO**/p bilayer. Owing to this fact, **ZnO**/p interfaces are more abrupt than the ITO/p interfaces and, therefore, they are good to be applied in amorphous silicon-based solar cells.

IT 1314-13-2, **Zinc oxide zno**,
uses

(chem. changes of ITO/p and **ZnO**/p interfaces as
function of deposition parameters)

RN 1314-13-2 HCA

CN Zinc oxide (ZnO) (9CI) (CA INDEX NAME)

O==Zn

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 76

IT Interface
Solar cells

(chem. changes of ITO/p and **ZnO**/p interfaces as
function of deposition parameters)

IT Vapor deposition process
(plasma; chem. changes of ITO/p and **ZnO**/p interfaces as
function of deposition parameters)

IT Magnetron sputtering
(radio-frequency; chem. changes of ITO/p and **ZnO**/p
interfaces as function of deposition parameters)

IT 1333-74-0, **Hydrogen**, uses
(Si **doped** with; chem. changes of ITO/p and **ZnO**
/p interfaces as function of deposition parameters)

IT 1314-13-2, **Zinc oxide zno**,
uses 50926-11-9, Ito
(chem. changes of ITO/p and **ZnO**/p interfaces as
function of deposition parameters)

- IT 7440-74-6, Indium, formation (nonpreparative)
(chem. changes of ITO/p and **ZnO**/p interfaces as
function of deposition parameters)
- IT 19287-45-7, Diborane
(chem. changes of ITO/p and **ZnO**/p interfaces as
function of deposition parameters)
- IT 7803-62-5, Silane, reactions
(chem. changes of ITO/p and **ZnO**/p interfaces as
function of deposition parameters)
- IT 7440-21-3, Silicon, uses
(hydrogenated amorphous; chem. changes of ITO/p and **ZnO**
/p interfaces as function of deposition parameters)

L49 ANSWER 7 OF 14 HCA COPYRIGHT 2003 ACS on STN

129:224328 Current change method of reducing gas sensing using
ZnO varistors. Agarwal, Gaurav; Speyer, Robert F. (Georgia
Institute of Technology, School of Materials Science and
Engineering, Atlanta, GA, 30332, USA). Journal of the
Electrochemical Society, 145(8), 2920-2925 (English) 1998. CODEN:
JESOAN. ISSN: 0013-4651. Publisher: Electrochemical Society.

AB The cond. of partially sintered doped **ZnO** varistor pellets
increases via two mechanisms with **introduction** of
H2/Ar or CO/Ar atms. Reducing gas extd. chemisorbed oxygen,
which in turn reduced current-opposing potentials which had formed
at grain boundaries. This mechanism was gas concn. independent.
After more extended times, the cond. showed a 2nd increase as extn.
of **lattice** oxygen near the grain boundaries further
lowered the grain boundary Schottky barriers. During this time
period, the time rates of change of current through the sensor
increase with H2 concn. (1 to 20%), when the compact sustained
continuous porosity, and was heated between 300 and 500.degree..
This resulted from the rate of extn. of **lattice** oxygen
being limited by the availability of H2 gas at grain boundary neck
surfaces. CO/Ar atms. were less effective at removing chemisorbed
and **lattice** oxygen, and current slope sensitivity to CO
concn. was not demonstrated.

IT 1314-13-2, Zinc oxide (**ZnO**),
properties
(current change method of reducing gas sensing using **ZnO**
varistors)

RN 1314-13-2 HCA

CN Zinc oxide (**ZnO**) (9CI) (CA INDEX NAME)

O== Zn

CC 76-14 (Electric Phenomena)
ST **zinc oxide** varistor gas sensor
IT Electric conductivity
Gas sensors
Schottky barrier
Varistors

(current change method of reducing gas sensing using **ZnO** varistors)

IT 1314-13-2, **Zinc oxide (ZnO)**,
properties

(current change method of reducing gas sensing using **ZnO** varistors)

L49 ANSWER 8 OF 14 HCA COPYRIGHT 2003 ACS on STN

127:75125 Current change method of hydrogen sensing using **ZnO** varistors. Agarwal, Gaurav; Speyer, Robert F. (School of Materials Science and Engineering, Georgia Institute of Technology, Atlanta, GA, 30332, USA). Proceedings - Electrochemical Society, 96-27 (Ceramic Sensors), 78-91 (English) 1997. CODEN: PESODO. ISSN: 0161-6374. Publisher: Electrochemical Society.

AB The elec. cond. of partially sintered doped **ZnO** varistor pellets increases by two mechanisms with **introduction** of a **H2**-Ar gas atm. Hydrogen removes chemisorbed oxygen, which reduces a current-opposing potential which had formed at grain boundaries. This mechanism was gas-concn.-independent. After longer times, the cond. showed a H2-sensitive increase as extn. of **lattice** oxygen near the grain boundaries lowered the Schottky barriers. The time slope of current through the sensor increased continuously with H2 concn. (1-11%) when the compact sustained continuous porosity, and was heated to 300-500.degree.. The varistor characteristics of the compact may be used to adjust the sensitivity of the sensor to specific hydrogen concns.

IT 1314-13-2, **Zinc oxide**, uses
(varistors; current change method for electrochem. gas sensors for hydrogen detns. using **ZnO** varistor pellets)

RN 1314-13-2 HCA

CN Zinc oxide (ZnO) (9CI) (CA INDEX NAME)

O= Zn

CC 79-1 (Inorganic Analytical Chemistry)
Section cross-reference(s): 47, 72

ST **zinc oxide** varistor hydrogen sensor; electrochem
gas sensor hydrogen varistor; Shottky barrier electrochem gas sensor

IT Varistors
(current change method for electrochem. gas sensors for hydrogen detns. using **ZnO** varistor pellets)

IT Gas sensors
(electrochem.; current change method for electrochem. gas sensors for hydrogen detns. using **ZnO** varistor pellets)

IT Schottky barrier
(in current change method for electrochem. gas sensors for hydrogen detns. using **ZnO** varistor pellets)

IT Electric conductivity
(**lattice**; in current change method for electrochem. gas sensors for hydrogen detns. using **ZnO** varistor pellets)

IT 1333-74-0, Hydrogen, analysis

(current change method for electrochem. gas sensors for hydrogen detns. using **ZnO** varistor pellets)

IT 7782-44-7, Oxygen, miscellaneous

(**lattice**; in current change method for electrochem. gas sensors for hydrogen detns. using **ZnO** varistor pellets)

IT 1314-13-2, **Zinc oxide**, uses

(varistors; current change method for electrochem. gas sensors for hydrogen detns. using **ZnO** varistor pellets)

L49 ANSWER 9 OF 14 HCA COPYRIGHT 2003 ACS on STN

127:53392 Depth profile analysis of thin film solar cells using SNMS and SIMS. Gastel, M.; Breuer, U.; Holzbrecher, H.; Becker, J. S.; Dietze, H. J.; Wagner, H. (Zentralabteilung Chemische Analysen, Forschungszentrum Julich, Juelich, D-52425, Germany). Fresenius' Journal of Analytical Chemistry, 358(1-2), 207-210 (English) 1997. CODEN: FJACES. ISSN: 0937-0633. Publisher: Springer.

AB SNMS (sputtered neutral mass spectrometry) and SIMS (secondary ion mass spectrometry) are used for the depth profile anal. of thin film solar cells based on amorphous silicon. In order to enhance depth resoln., model systems are analyzed only representing parts of the layered system. Results concerning the TCO (transparent conducting oxide)/p interface and the n/i interface are presented. To minimize **matrix** effects, SNMS is used when the sample consists of layers with different **matrixes**. Examples are the TCO/p interface (where the transition lengths of the depth profiles are found to be sharper when **ZnO** is used as TCO compared to SnO₂) and SnO₂/**ZnO** interfaces in coated TCO Layers (where A Sn contamination inside the **ZnO** layer is found depending on the plasma pressure during the **ZnO** deposition). SIMS is used when the limits of detection reached by SNMS are not sufficient. Examples are H depth profiles in **ZnO** layers or P depth profiles near the n/i-interface.

IT 1314-13-2, **Zinc oxide**, uses

(depth profile anal. of thin film transparent oxide interface in amorphous Si solar cells using SNMS and SIMS)

RN 1314-13-2 HCA

CN Zinc oxide (**ZnO**) (9CI) (CA INDEX NAME)

O= Zn

IT 1333-74-0, **Hydrogen**, uses

(**dopant**; depth profile anal. of thin film amorphous Si solar cells using SNMS and SIMS)

RN 1333-74-0 HCA

CN Hydrogen (8CI, 9CI) (CA INDEX NAME)

H-H

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 73

IT 1314-13-2, **Zinc oxide**, uses
18282-10-5, Tin dioxide
(depth profile anal. of thin film transparent oxide interface in
amorphous Si solar cells using SNMS and SIMS)

IT 1333-74-0, **Hydrogen**, uses 7440-44-0, Carbon,
uses
(**dopant**; depth profile anal. of thin film amorphous Si
solar cells using SNMS and SIMS)

L49 ANSWER 10 OF 14 HCA COPYRIGHT 2003 ACS on STN
124:217769 Transparent electroconductive and electroinsulative films and
fabrication of semiconductive photoelectric transducers using
thereof. Furubiki, Shigemi; Nishitani, Mikihiro; Wada, Takahiro;
Hirao, Takashi (Matsushita Electric Ind Co Ltd, Japan). Jpn. Kokai
Tokkyo Koho JP 07331413 A2 19951219 Heisei, 5 pp. (Japanese).
CODEN: JKXXAF. APPLICATION: JP 1994-126171 19940608.

AB The title fabrication involves Ar-ion beam sputtering with
ZnO/Al₂O₃ targets in O₂ or H₂ to provide a **H-** or
O-doped ZnO:Al₂O₃ film with a cond.-controlled
transparent **ZnO** film. The process gives the
alumina-dispersed **ZnO** film decreased crystal
lattice defects with decreased elec. resistance or increased
elec. insulation by the doping.

IT 1333-74-0, **Hydrogen**, uses
(**dopant**; prepn. of **zinc oxide** elec.
cond.- and resistance-controlled transparent film with)

RN 1333-74-0 HCA
CN Hydrogen (8CI, 9CI) (CA INDEX NAME)

H-H

IT 1314-13-2DP, **Zinc oxide (ZnO)**,
alumina-dispersed
(doping; prepn. of elec. cond.- and resistance-controlled
transparent film)

RN 1314-13-2 HCA
CN Zinc oxide (ZnO) (9CI) (CA INDEX NAME)

O=Zn

IC ICM C23C014-08
ICS C23C014-46; H01L031-04

CC 76-3 (Electric Phenomena)
Section cross-reference(s): 52, 57, 74

ST **zinc oxide** transparent film conductor insulator;
**oxygen hydrogen doping alumina zinc
oxide**

IT Group IIIA elements
(dispersant; prepn. of **zinc oxide** elec.
cond.- and resistance-controlled transparent film with)

- IT Electric conductivity and conduction
(doping of transparent **zinc oxide** film for control of)
- IT Diffusion
(of transparent **zinc oxide** film for control of cond. and elec. resistance)
- IT Electric conductors
Electric insulators and Dielectrics
(**zinc oxide**, film, doped; transparent electroconductive and electroinsulative films and fabrication of semiconductive photoelec. transducers using thereof)
- IT 1344-28-1, Alumina, uses
(dispersant; prepn. of **zinc oxide** elec. cond.- and resistance-controlled transparent film with)
- IT 1333-74-0, **Hydrogen**, uses 7782-44-7, Oxygen, uses
(**dopant**; prepn. of **zinc oxide** elec. cond.- and resistance-controlled transparent film with)
- IT 1314-13-2DP, **Zinc oxide** (ZnO), alumina-dispersed
(doping; prepn. of elec. cond.- and resistance-controlled transparent film)

L49 ANSWER 11 OF 14 HCA COPYRIGHT 2003 ACS on STN

- 119:284951 Intercalation compounds of some mixed oxides of uranium. Dickens, P. G.; Stuttard, G. P.; Dueber, R. E.; Woodall, M. J.; Patat, S. (Inorganic Chemistry Laboratory, University of Oxford, South Parks Rd., Oxford, OX1 3QR, UK). Solid State Ionics, 63-65(1-4), 417-23 (English) 1993. CODEN: SSIOD3. ISSN: 0167-2738.
- AB UM05 (M = V, Sb, Ti, Mo) which have closely related structures, can act as versatile host **matrixes** for the intercalation of small electropos. atoms. An account is given of recent work on the structural, energetic and electronic features of the oxides and their intercalation compds.
- IT 1333-74-0, **Hydrogen**, reactions
(**intercalation** reaction of, with titanium uranium oxide in presence of platinum)
- RN 1333-74-0 HCA
- CN Hydrogen (8CI, 9CI) (CA INDEX NAME)

H-H

- CC 78-3 (Inorganic Chemicals and Reactions)
Section cross-reference(s): 69, 72, 75, 77
- IT 1333-74-0, **Hydrogen**, reactions
(**intercalation** reaction of, with titanium uranium oxide in presence of platinum)
- IT 151512-19-5P, Titanium uranium **zinc oxide** (TiUZn0.3O5) 151512-20-8P, Magnesium titanium uranium oxide (Mg0.3TiUO5)
(prepn. and free energy of formation of)

L49 ANSWER 12 OF 14 HCA COPYRIGHT 2003 ACS on STN

117:80978 Studies of substrate induced disorder in amorphous silicon by in-situ-Raman backscattering during film growth. Schubert, M. B.; Bauer, G. H. (Inst. Phys. Elektron., Univ. Stuttgart, Stuttgart, D-7000/80, Germany). Conference Record of the IEEE Photovoltaic Specialists Conference, 21st(2), 1595-1600 (English) 1990. CODEN: CRCNDP. ISSN: 0160-8371.

AB Amorphous Si **matrix** disorder was extremely sensitive to the material and to the chem. compn. of the substrate. The correlation with Urbach energies from photothermal deflection spectroscopy indicates complicated changes in the electron d. of states thus contradicting a simple correlation of the valence band edge with angle fluctuations. Raman measurements performed in-situ during subsequent breaks of deposition give strong evidence for the presence of a highly distorted interfacial layer on ITO and some less distortions on glass and on **ZnO**, while fully relaxed film growth is obsd. on metal layers.

IT 1314-13-2, **Zinc oxide**, uses
(hydrogenated amorphous silicon deposited on, disorder in, in-situ Raman backscattering study of)

RN 1314-13-2 HCA

CN Zinc oxide (ZnO) (9CI) (CA INDEX NAME)

O= Zn

CC 76-3 (Electric Phenomena)

Section cross-reference(s): 75

IT 1314-13-2, **Zinc oxide**, uses 7429-90-5,

Aluminum, uses 50926-11-9, ITO

(hydrogenated amorphous silicon deposited on, disorder in, in-situ Raman backscattering study of)

IT 1333-74-0, **Hydrogen**, uses

(silicon **doped** with, substrate induced disorder in, in-situ Raman backscattering study of)

L49 ANSWER 13 OF 14 HCA COPYRIGHT 2003 ACS on STN

109:112575 Effect of the method of copper oxide addition on chemisorption properties of zinc-containing sulfur-purification materials. Dantsig, G. A.; Grechenko, A. N.; Grigorev, V. V.; Serova, L. P.; Yagodkina, G. N. (Gos. Inst. Azotn. Prom. Prod. Org. Sint., Novomoskovsk, USSR). Zhurnal Prikladnoi Khimii (Sankt-Peterburg, Russian Federation), 61(6), 1240-6 (Russian) 1988. CODEN: ZPKHAB. ISSN: 0044-4618.

AB The chemisorption of H₂S and other S-contg. materials on S-purifn. agents (oxides, e.g., GIAP-10-2) occurs 50-70.degree. lower than on activated **ZnO**. The effect of CuO on the sorption properties of S-purifn. agents was studied using a mixt. of basic carbonates of Zn and Cu and a mixt. of **ZnO** and CuO treated with (NH₄)₂CO₃. The presence of Cu in the mixt. significantly enhanced the decompn. of H₂S before chemisorption. The (NH₄)₂CO₃

treatment of CuO and **ZnO** resulted in the formation of double salts, which, after being reduced by **H₂**, facilitated the **introduction** of Cu into the **ZnO lattice**. The Cu in the S-purifn. agents acts as a promoter, enhancing the reaction between H₂S and **ZnO**.

IT 1314-13-2, **Zinc oxide**, reactions
(hydrogen sulfide chemisorption by, copper oxide effect on)
RN 1314-13-2 HCA
CN Zinc oxide (ZnO) (9CI) (CA INDEX NAME)

O—Zn

CC 48-1 (Unit Operations and Processes)
Section cross-reference(s): 49
ST copper oxide hydrogen sulfide sorbent; **zinc oxide**
hydrogen sulfide sorbent; sulfur purifn material hydrogen sulfide sorbent
IT 1314-13-2, **Zinc oxide**, reactions
(hydrogen sulfide chemisorption by, copper oxide effect on)
IT 506-87-6, Ammonium carbonate
(in prepn. of **zinc oxide**, for purifn. of sulfur)

L49 ANSWER 14 OF 14 HCA COPYRIGHT 2003 ACS on STN
78:141294 Radiochemical method for determining electron concentrations in solid materials. Thiemt, K. (Sekt. Chem., Tech. Univ. Dresden, Dresden, Ger. Dem. Rep.). Kristall und Technik, 7(9), K99-K101 (German) 1972. CODEN: KRTEAW. ISSN: 0023-4753.
AB The electron concn. in solids, particularly in nonstoichiometric oxides, is detd. by the tritium-doped **H** released when the oxide is dissolved in an acid. The **H** is released by quasi-free electrons in the **lattice**, present due to the defect structure of the nonstoichiometric oxide Mem .+-. .gamma.On, where .gamma. may be extremely small. By using **ZnO** as an example, the defect structure in such an oxide is caused mainly by interstitially placed Zn⁺ ions. The **H** is created by the conducting electrons in the solid, which react with the hydronium ions of the acid soln.: e-aq + H₂O⁺ .fwdarw. H* + H₂O H* + H* .fwdarw. H*₂ where **H*** denotes tritium-doped **H**. Since very little **H** is evolved and only a small fraction of this is **H***, a sensitive method of detecting **H*** had to be developed. The app. used was described briefly. If the sample is dissolved in an acid with the sp. activity A_s = 25 mCi/ml, this would correspond to a limit of detection of 4 .times. 10⁻¹¹ mole H₂, which corresponds to 8 .times. 10⁻¹¹ mole electrons. If 500 mg **ZnO** is used, this means a Zn excess of 6 ppb or a .gamma.-value of 7.5 .times. 10⁻⁹.
CC 70-4 (Crystallization and Crystal Structure)
Section cross-reference(s): 71
IT Electron configuration
(detn. of, in solids by tritium-doped hydrogen

- release during dissolution)
- IT Oxides, properties
(electron concn. in, detn. by tritium-doped
hydrogen release during dissolution)
- IT 1333-74-0, uses and miscellaneous 10028-17-8, uses and
miscellaneous
(in electron concn. detns. in solids, by tritium-doped
hydrogen release during dissolution)